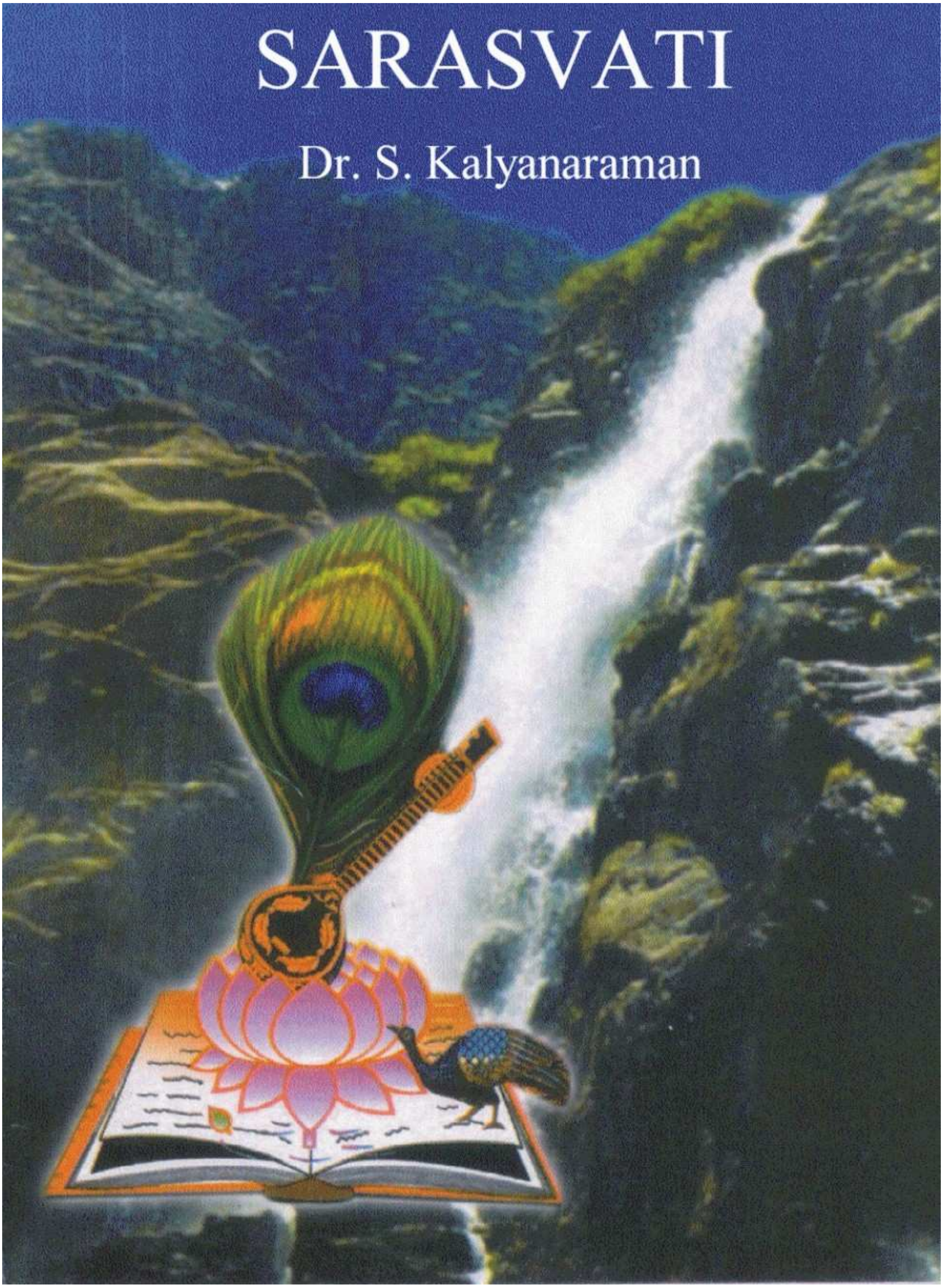

SARASVATI
Dr. S. Kalyanaraman

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Babasaheb (Umakanta Keshav) Apte Smarak Samiti

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Section 1 River Sarasvati: discovery and revival

Sarasvati, in the continuing tradition of Bha_rat from the days of the R.gveda, is adored in many forms: Sarasvati as goddess, Sarasvati as river and Sarasvati as mother (devi_ ru_pa_, nadi_ ru_pa_, ma_tr. ru_pa_ sarasvati_).

Sarasvati River is adored in the Rigveda as: **ambitame, nadi_tame, devitame Sarasvati_** (best of all mothers, best of all rivers,best of all godesses) (RV 2.41.16). [All r.cas referring to Sarasvati_ are presented in a separate section].

She is a mother because she nourished a civilization on her banks. She is a river which had flowed from the Himalayas to the Arabian Sea – Sindhu sa_gara -- carrying the glacier waters which are today carried by the Sutlej and Yamuna rivers.

Sarasvati, the goddess, lives in the hearts of every citizen of Bharat. She is a goddess adored ever since the days of the R.gveda, and all over Bha_rat as the goddess of arts and crafts, as the goddess of learning. The civilization nourished by the Sarasvati had transformed the chalcolithic (copper and stone) age into the bronze (copper-tin, copper-arsenic alloys or bronze and brass) age resulting in a revolutionary way to relate to the material phenomena of the world, using hardened metal tools and weapons. She is a goddess of the Saptasindhu region; her va_hana is a peacock or a ham.sa. She carries a veena (lute, string-instrument) on her hands. As Mother Goddess, she is also depicted as Durga who is adored with weapons in her multiple hands, as Mahis.a_suramardini (the killer of the demon, Mahis.a, of the bull form). Many goddesses are mentioned in the R.gveda – Il.a_, Mahi_, Bha_rati_ and Sarasvati_; of these, Sarasvati_ (also known as Bha_rati_) is an enduring memory, symbolizing knowledge and nation-hood: va_kdevi or vidya_devi and Bharat, that is the Indian Nation. Sarasvati is the personification of the sacred river, the Sarasvati, and is identified with Vac, the goddess of speech, as an apri_ devata_ in the R.gveda. She is the patroness of art, music, and letters. Her

name as Bra_hmi_ is given to the earlier forms of the Devanagari script in which Sanskrit was written. The synonym of ***sarasvatì*** (goddess of ***vàk*** = speech or language) is ***bra_hmì_*** which is the name given to the early scripts used in Ašoka's epigraphs of circa 300 B.C. and the early scripts of Tamil also use bra_hmi_.

She is jn~a_na, knowledge personified. She is va_k, speech.

Atharvaveda classifies the gods, according to locus or station, in a hymn [It is notable that Rudra is called tryambaka, having three mothers: RV 7.59.12; cf. Agni referred to as trima_ta_, as having three mothers in RV 3.56.5; Tryambaka homa is prescribed for both Rudra and Ambika_ in VS 30.8). Tryambaka Homa is an offering of sacrificial cakes to the goddess at the cross-roads. (S'B 2.6.2.4-17; Tait. Br. 1.6,10; A_pastamba S' Su. 8.17.1-18.10). Maitra_yan.i Sam.hita_: ambi_ vai bhagana_mni_, tasma_ trayambaka_h, the goddess' name is suggested as Bhaga. (1.10.20). Ka_t.haka Sam.hita_ (36.14) calls her Bhaga_. Old Tamil amma, amma_ for mother is relatable to amba_. (R.Caldwell, *A Comparative Grammar of the Dravidian*, London, 1875, pp. 455, 499; G. Oppert, *Original inhabitants of India*, p. 42). The reference to trima_ta_ in RV 3.56.5 may relate the three sacred ladies of the waters mentioned in the same hymn (r.ta_vari_ryos.ana_stgrisro apya_h) and may be related to il.a_, sarasvati_ and bha_rati_ (cf. RV 3.29.3 which makes Agni the son of Il.a_). Minoan Idaean Mother derived her name from the mountain Ida in Crete; in Greek mythology, Ida, like Il.a_ represents food and speech. The surmise is that the veneration of goddess Il.a_ spread from Indian to the Minoan islands. (S.K. Dikshit, *The Mother Goddess*, p. 78).

Sarasvati_ assumes the forms of rivers, waters and of va_k, speech and as a celestial goddess, she is called the purifying (s'odhayitri_) pa_vi_ravi_ va_k. [pa_vi_ravi_: pa_vi_ravi_ kanya_ citra_yuh sarasvati_ s'odhayitri_ (RV 6.49.7) = TS 4.1.11.2. Pa_tru_n vi_ra_m.s'ca janayati_ti; pa_vi_rava = fr. pavi_ru (vidyut), i.e., proceeding from the thunderbolt]. The(cf. G.V. Davane, The Goddess Sarasvati in Sanskrit Literature, *Journal of the University of Bombay*, Vol. XXXVII, Oct. 1968, p. 72). An alternative view is that Sarasvati_ is not merely a

personification of a river and a goddess of speech, but an aerial goddess with the ability to pour rain and to perform extraordinary feats (balakr.ti)(Raghunath Airi, Va_g Vai Sarasvati_, p. 201, *AIOC*, Varanasi, Oct. 1968).

The term, ‘va_k’ has remarkable associations with river-waves and thunder of the clouds:

_प्रति ष्टोभन्ति सिन्धवः पविभ्यो यद् अभ्रियां वाचम् उदीरयन्ति ।

अव स्मयन्त विद्युतः पृथिव्यां यदी घृतम् मरुतः प्रुष्णुवन्ति ॥

1.168.08 The rivers are arrested by the thunderbolts when they utter the voice of the clouds; but the lightnings smile in the firmament when the Maruts sprinkle water on the earth.

In this r.ca, va_k is equated with the thundering sound of river-waves dashing against the chariot fellies. The poet hears this as a loud praise offered to the Maruts. Parjanya sends forth a mighty wondrous voice in response to Maitra_varun.a (RV 5.63.6). The sound of thunder, storm and rain is ‘va_k’ and this phenomenon personified explains how Maruts speak with their voice from the clouds (RV 10.77.1). Va_k is also related to human speech. Urvas’i_ asks of Puru_ravas: what should I do with these words of yours? (RV 10.95). (G.K. Bhat, R.gvedic Va_K: some semantic aspects, in: *Golden Jubilee Volume*, ed. T.N. Dharmadhikari, Poona, Vaidika Sams’odhana Mandala, 1981, pp. 8-16).

Sarasvati_ assists Indra with the foam of water which acts as a thunderbolt to slay Namuchi. (S’B 12.7.3.5). Sarasvati_-Va_k assists the As’vins to restore the head of Makha (sacrifice) (S’B 14.2.12.1). Va_k as identified with Sarasvati_ assisted Varun.a in getting his departed lustre restored. (S’B 5.4.5.2,7). In the Agnichayana rite, the sacrificer is to get anointed with the help of Sarasvati_-Va_k. (S’B 9.3.4.17). In addition, it should be noted that va_k is regarded as the principal female element represented as tisro devi_h (il.a_, sarasvati_, bha_rati_) in the a_pri

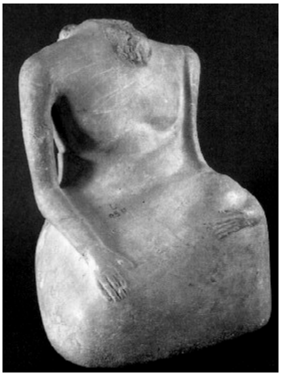
r.cas of the R.gveda. (A_pri hymns are propitiatory hymns or mantras for sacrifice, recitation of which delight the gods; there are only ten which are invocations to Agni under different names and are employed in the parya_jas of animal sacrifices. Each hymn belongs to the family of one seer. Thre three hymns of Man.d.ala I belong respectively to Medha_tithi, Di_rghatamas and Gastya; two of the Man.d.la X to Sumitra and Jamadagni; and five others to Gr.tsamada, Vis'va_mitra, A_treya, Vasis.t.ha and Devala. There is no A_pri hymn in the books of Va_madeva and Bharadva_ja. Each A_pri hymn has normally eleven stanzas, each stanza attributed to a separate deity. The deities are mentioned in a specific order. Among them are five goddesses: Us.as, Sandhya_ (Nakra_), Sarasvati_, Id.a_ and Bha_rati_.) Va_k is referred to as the three goddesses in Maitra_yan.i Sam.hita_ (va_gvai tisro devi_h 1.10.9) and Ka_t.haka Sam.hita_ (36.3). The three names are three appellative names of Va_k in three divisions of space. (Madhusudana Ojha, *A_dhidaivika_dhya_ya*, Jaipur, 1950, p.9). In fact, they are called three Sarasvatis or three Bha_ratis:

> **deva_ aduh su_ryo ada_d dyaurada_t pr.thivyada_t tisrah sarasvati_raduh sacitta_ vis.adu_s.an.am**

AV 6.1100.1 The gods have given, the sun has given, the sky has given, the earth has given, the three Sarasvatis have given, accordant, the poison-spoiler.

> **hota_ yaks.atpes'asvati_stisro devi_r hiran.yayi_r bha_rati_rbr.hati_r mahi_h patimindram vayodhasam vira_jam chanda ihendriyam dhenum ga_m na vayo dadhahyantva_jyasya hotaryaja**

Yajus. 28.31 Let the Priest sacrifice to three well-decorated goddesses, gold-decked great, lofty, Bha_ratis, Indra their lord who gives strength, bringing him mighty power, vira_j the metre, and a cow in milk. Let him enjoy the butter. Hotar, worship. [Bha_ratis = Bha_rati_ and her two constant companions, Sarasvati_ and Id.a_]. Vira_j is identified by the asuras with the goddess Ma_ya_ (AV 8.10.22).





Mohenjodaro: On the back of the figure the hairstyle can be reconstructed by a wide swath of hair and a braided lock of hair or ribbon hanging along the right side of the back; a cloak draped over the edge of the left shoulder covers the folded legs and lower body; the right shoulder is left bare; the right hand rests on the right knee folded beneath the body; the left arm clasps the left knee. (limestone, 28 cm. High, 22cm. Wide; Islamabad museum; Marshall 1931: 338-9, pl. C, 1-3).

Extolling the vira_j. AV 8.10.22: She ascended; she came to the Asuras; the Asuras called to her: O illusion (ma_ya_), come! Of her Virochana son of Prahra_da was young (vatsa), the metal (ayas-) vessel (was) vessel; her Dvimu_rdhan son of R.itu milked; from her he milked illusion; that illusion the Asuras subsist upon; one to be subsisted on becomes he who knows thus.

Gold repousse plaque showing nude Mother-goddess figure, from Burial Mound M, Lauria Nandangarh, Champaran district, Bihar, ca. 6th to 5th cent. B.C., from a

Vedic burial (ASI).[Coomaraswamy notes that this is an anthropomorphic representation of Aditi, the Earth Goddess (Ananda Coomaraswamy, *History of Indian and Indonesian Art*, p. 10)].

[The word, 'ma_ya_' occurs sixty times in the R.gveda, mainly connected with Mitra and Varun.a and at times with Indra, whose 'occult power' is referred to. Thus, ma_ya_ is an epithet of asura, the 'mysterious lord'. People with bent necks called mu_radeva_h prevailed thanks to the genius of ma_ya_. (RV 7.104.34). S'vetas'vatara Upanis.ad (4.9-10) notes Ma_ya_ as designate Nature (Prakr.ti). Ma_ya_'s spouse Mahes'vara, called Ma_yin creates all the manifestations and principles of Rhythms, Sacrifices, Ceremonies, Ordinances, the past, the future and what else the Vedas declare. The Qxyrynchus Papyrus (No. 1280), 3rd cent. B.C. records the names of great mother-goddesses: isis, atargatis, astartate, nanaia and ma_iya_, who wasw the great Indian mother-goddess worshipped in the Gangetic valley. Ma_iya_ was stated to preside over rain and fertility and was invoked as bringing the floods in the Ganga. The name Ma_iya_ is equated with Ma_ya_, occurring in As'vaghos.a's *Sauundara_nanda* (2nd cent. A.D.) as the goddess of heaven (divi ma_yeva devata_). [E.H. Johnston, A terracotta figure at Oxford, JISOA, Vol. X, 1942, pp. 94-102].

Sarasvati, the river – the ancient courses of the river and the glacial sources --, has been discovered. The river's sources and ancient courses (called palaeo-channels) have been the object of investigations, conjectures or information since the mid-19th century. She has been adored in the oldest human documents such as the Rigveda in over 70 r.cas and in the Great Indian Epics, the Maha_bha_rata and the Ra_ma_yan.a. The tradition of Bha_rat is emphatic that the source of the river from a Plaks.a tree among the glaciers of the Himalayas (Plaks.a Pras'ravan.a). As described in about 200 s'lokas of the S'alya Parva of the Great Epic, the elder brother of Sri Krishna, Sri Balara_ma travels along the banks of the river from Dwa_raka through Somnath (Prabha_s Patan) to Mathura, paying homage to his ancestors. So have millions of people been paying and continue to pay homage to the r.s.is and munis who have made this Bha_rata Ra_s.t.ra a nation,and their

ancestors by offering pitr. tarpan.a on the ghats of this sacred river and the many ashrama_s which dot the river bank all along her 1,600 km. course in North-west Bharat. On the banks of River Sarasvati are found many sacred places which are pilgrimage centers for millions of pilgrims for generations.The Bha_rati_ya socio-cultural tradition nurtured in the Sarasvati River Basin endures to this day in all walks of life and all art forms – in music, dance, drama, painting, scultpture, inscriptions, literature, scriptures, sacred texts and in temples. Even an icon such as the swastika_ found in over 50 seals and tablets of the civilization endure to the present day as a sacred symbol of welfare decorating the frontals of millions of residences, temples and holy places all over Bha_rat.

Sarasvati, the river, will come alive in this 52nd millennium of the Kaliyuga (or, 21st century of the Common Era). [See map showing Sarasvati Nadi from Adh Badri to Thanesar in Haryana State].

In the central Sarasvati River Basin, in Rajasthan alone, it is feasible to have one million sustainable tube wells, using the groundwater sanctuaries. Development activities include: Ground water management/Land-use systems; reconstruction of NW India Drainage System; structures for groundwater recharge; improvements to sub-surface drainage (antah salila_ sarasvati_: there are many groundwater sanctuaries and aquifers); afforestation, growing crops such as salicornia brachiata (edible oil), almonds, olives, avoiding crops such as rice, wheat or sugar-cane to avoid use of surface water (to eliminate evapotranspiration); use of solar- and wind-power.

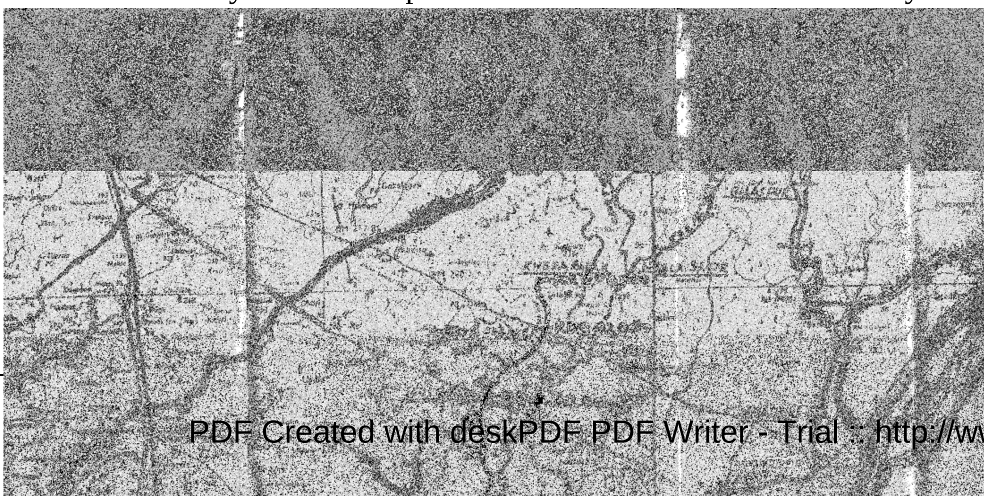
An event unparalled in the history of human civilization is taking shape in Bharat, an event which should make every Indian feel proud not only of the ancient heritage of Bharat, but also demonstrate to the world the technological capabilities of India in taking on the extraordinary challenge of reviving a mighty Himalayan River which nurtured the civilization of Bha_rat for thousands of years. As the river gets revived to benefit over 200 million people in NW India, India will awaken to the imperative of ensuring water and food security and the potential for

developing India to greater heights in all fields of human endeavour. While Bha_rat awakens blessed by the spiritual splendour of Sarasvati, the entire world humanity will rejoice a renewal of a very ancient heritage, nurtured on the banks of the Vedic Sarasvati, and a celebration of universal human spirit and endeavour for over 4 millennia.

Projects are ongoing which will have a long-term beneficial impact on major parts of North West India and revive memories of over 5,000 years ago, by reviving the mighty Sarasvati River. A mighty perennial river which had nurtured an ancient civilization which has given us the Vedas, had been desiccated due to tectonic causes, river migrations and aeolean activity (aandhi phenomenon). This is an unparalled event in the history of human civilization. Today technological means are available to revive this sacred river and to make the legacy of Sarasvati meaningful not only to entire Bha_rat but to the whole world. The project to revive Sarasvati River will be a superb project, of international significance.

Three projects to revive the legendary Sarasvati River were inaugurated during 1999.

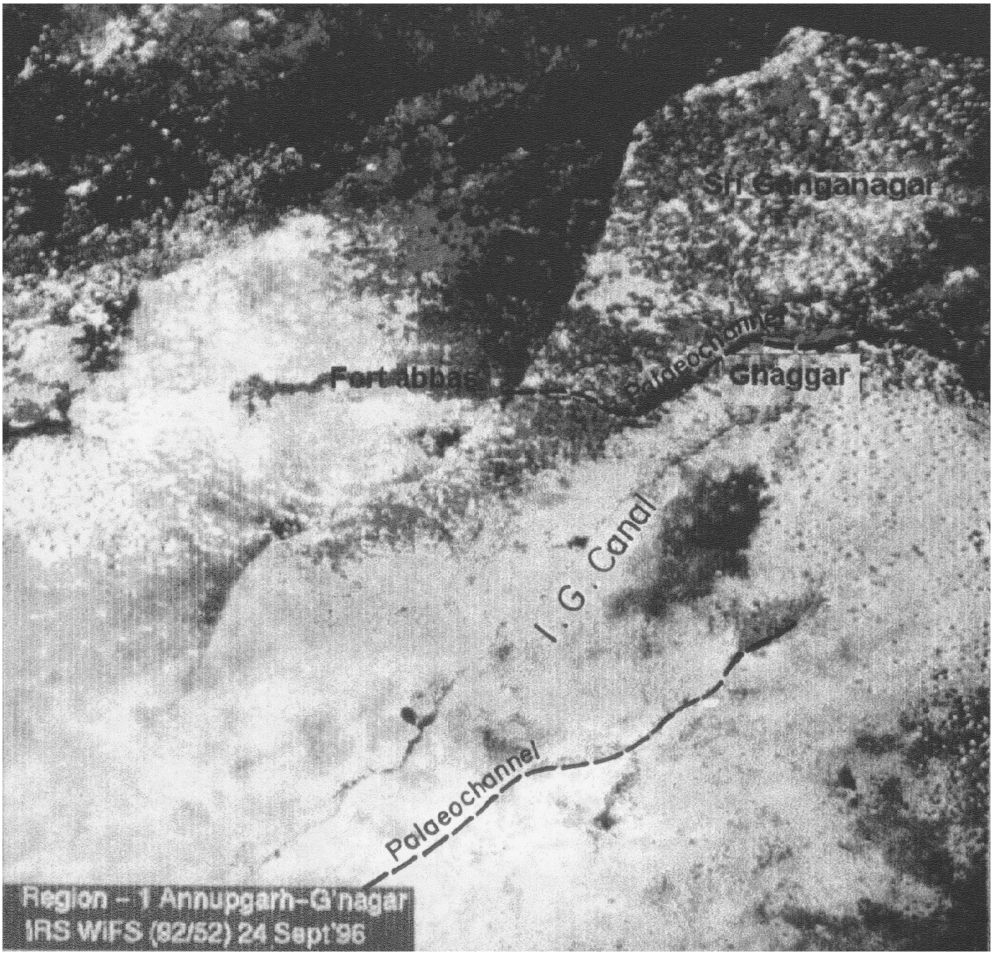
Sarasvati Nadi Project map (September, 2000). One small step for Bha_rat but a giant spiritual leap for humanity to revive Sarasvati Nadi (using the course as shown in the Survey of India maps and ancient revenue records of Haryana State)



from Adh Badri – on the foothills of the Siwalik mountain ranges, close to the glaciers of Himalayan massifs -- to Thanesar (Kurukshetra), coursing through Kapalamochan, Bilaspur and on to Pehowa (Pr.thudaka of the Maha_bha_rata), with Sarasvati Ghats for pilgrims to offer homage to ancestors (Pitr. tarpan.am).

- One project is to re-activate the ancient channels of the river from Adh Badri (Yamunanagar Dist.) to Pehoa (referred to as Pruthudaka in the Great Indian Epic, Mahaabhaarata)
- The second project to provide a piped feeder from the Bhakra Main canal to Pehoa, using the perennial waters of the Sutlej emanating from the Mansarovar glacier in Mt. Kailash. 50% of the cost is financed by a private philanthropist.The river channel from Adh Badri to Pehoa is mentioned as Sarasvati Nadi on the Survey of India topo-sheets. This project is financed by the World Bank as part of the package of $139 million US Dollars for rejuvenation of the water systems of North West India. The re-activation of this section will keep the river flowing all 365 days of the year upto Pehoa and beyond. Pehoa has the ancient Vasishtha ashram where the Sarasvati River becomes east-flowing and Sarasvati Ghats where homage to ancestors (pitru tarpan.a) is offered by pilgrims. The ghats are more ancient than the pilgrimage ghats in Varanasi on the Ganga River. This pilgrimage site was also visited by Balarama during his pilgrimage from Dwaraka to Mathura along the course of the Sarasvati River which is described in the s'alya parva of the Great Indian Epic
- The third project is to map the ancient drainage system of the Sarasvati River and identify groundwater aquifers and sanctuaries, over a stretch of 1600 kms. from Bandarpunch massif in Western Garhwal (Har-ki-dun glacier) to the Arabian Sea near Somnath (Prabhas Patan, Gujarat) using the remote sensing application centre in Jodhpur, Rajasthan and tritium analysis by atomic scientists in Bhabha Atomic Research Centre This is a pre-requisite for re-designing the drainage system of NW India to benefit over 200 million people of the River Basin.

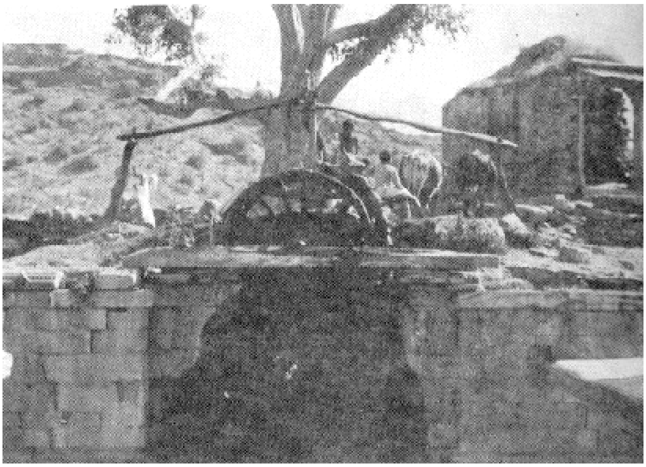
Mr. C.P. Thakur who was then the Union Minister for Water Resources made a presentation in Stockholm, Sweden in April 2000 during the conference of leaders of over 100 nations under the auspices of the Global Water Partnership of the United Nations. He presented a map of Bha_rat showing the proposed links of river basins of Bharat. This map (presented to the Parliament of the Nation in November 1996) is the result of magnificent work done by Bharat's engineers and scientists for over 18 years coordinated by the National Water Development Agency. Bha_rat is blessed by the Himalayas which are a source of perennial fresh water to sustain the civilization for generations to come. The projects include the revival of River Sarasvati to reach upto the River Sabarmati, by extending the Rajasthan Canal (which presently reaches upto Jaisalmer in the Marusthali_ desert).by a few hundred kilometers.

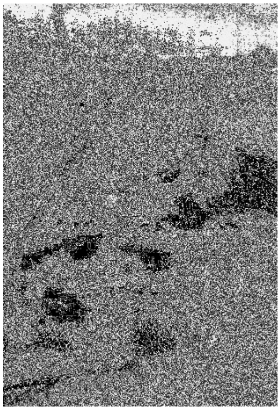


Palaeo-channel of River Sarasvati along the northern margin of the Marusthali_ desert, trending NE-SW through Kishangarh, Tanot, Ghantiyali, Sadewala, Longewala and Ghotaru. (Ongoing Sarasvati Project, Central Ground Water Authority, July 1999). Clean sands along internal courses of palaeochannels are attributed to water action and have been discovered in the depth range of 42m to

100 m. Neo-tectonism and river piracy diverted the River Sutlej to become a tributary of the Sindhu and diverted the waters of River Sarasvati in upper reaches to Yamuna. [River Sindhu or Indus, is formed in western Tibet by the confluence of the glacial streams from the Manasarovar glaciers (Mt. Kailas) of the Himalayas. It flows from Tibet northwest across Jammu and Kashmir in Bharat, passing between the western extremity of the Himalayas and the northern extremity of the Hindu Kush mountain range; it then courses generally south through Pakistan to the Arabian Sea, covering a distance of about 2736 km (about 1700 mi). The major tributaries of the Indus are the Sutlej, Ravi, and Chenab.]

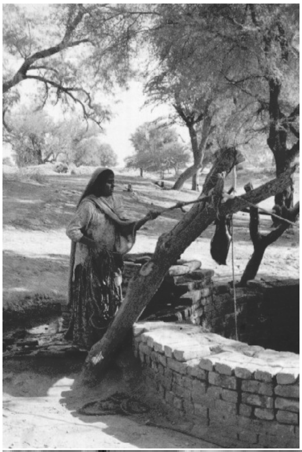
Vasanthgadh, Sirohi, Rajasthan; an ancient well of the copper age. (After Bapat, V.D., and Umapathy, K.R. (tr.), 1994, *Lost' River Sarasvati, Mysore*, Bharatiya Itihasa Sankalana Samithi (tr. from Vakankar, L.S. and



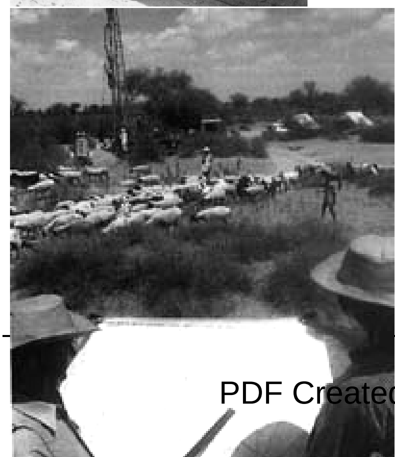


Parcure, C.N., 1992, *Lupta Sarasvati_ Nadi_ s'odh* (Marathi).

Islamgarh, Cholistan, on the banks of the Sarasvati River; a deep well supplying brackish water for animals. Compares with the well in Vasanthgad.h which is a more elaborate structure with a platform for supplying drinking water. (After., Pl. 5)



Derawar; potable water well; on the banks of the Sarasvati River. (After Mughal, R.M. 1997, *Ancient Cholistan*, Rawalpindi, Ferozzsons Pvt. Ltd., Pl. 6)





"About 400 km from the dunes in Jodhpur, a team of government scientists and technicians ready a giant jackhammer drill mounted on a truck, some four times larger than the ubiquitous rigs that drill for water. Next month monsters like this will be hauled to the desert, first to the dunes of Ghantiyal Ji and later to seven other sites in Rajasthan. From their three-storey-high masts, a rotating mechanical jaw with teeth of superhard diamond will eat into the earth. It will pull up undisturbed, layered cores of

sediment and water from 70 m below the surface. The cores are like calendars: each layer will reveal a snapshot of a past era, each foot tells the tale -- the climate, the geography -- of a few hundred years.

“It is an epochal history that the dunes hide. For, an excited band of remote-sensing specialists, hydrogeologists, archaeologists and historians is increasingly convinced the cores will prove a once-shaky theory that has gained much ground this decade: this arid wasteland was once the lush basin of the mystical, lost Sarasvati, a mighty river that spawned religious legends -- and a prehistoric culture not yet properly recorded in our history books…

“The Great Rann covers an area of ca. 20,000 sq. km. and the Little Rann covers an area of ca. 5,000 sq. km. The principal Sarasvati Civilization sites in the Rann of Kutch are: Desalpur, Pabumath, Shikarpur, Surkotada and Dholavira. In all these sites, mature Harappan artifacts such as painted pottery, stamp seals and etched carnelian beads have been found. The stretch of sites extended the Little Rann of Kutch further into Saurashtra through the Nal depression upto Lothal. The Nal depression is a shallow series of lakes which link the Little Rann of Kutch to the head of the Gulf of Khambat. The depression is 110 km. in length. There is a possibility that until late glacial or Holocene times, this depression was an arm of the sea. (Wadia, D.N., 1966, *Geology of India.* 3rd edn. New York. Macmillan: 310, 400). Pollen studies indicate that the Nal Sarovar was large and fresh from ca. 3000 to 1500 BC, when it seems to have dried up. (Vishnu-Mittre and Sharma, C., 1978, Pollen analysis of Nal Lake, Gujarat. *The Palaeobotanist*, 26: 96-104). Thus, the Ranns (Great and Little Ranns) are an extension of the Sindhu Sarasvati River Deltas. The Banni region in Kutch is pasture land and had for millennia been the home for pastoral migrant or nomadic communities.

“Tectonic activity in Kutch has led to the conjecture that the Ranns were perhaps lower and linked to the Arabian sea in prehistoric times. (Billimoria, N.M., 1947, The Great Indian Desert with special reference to the former existence of the sea in the Indus Valley (with two maps). *Journal of the Sind Historical Society*, 8(2): 85-

127). The formation of Allah Bund (Allah Dam) in 1819 was the direct result of a violent earthquake. “The New Madrid (Mississippi Valley—1811 and 1812, mid-plate events) and Kutch earthquakes are only the most prominent elements in our data set of 800 stable-continent events of a magnitude = 4.5 or more. The number may seem large, but it is the sum of a global record covering centuries or millennia (Many more earthquakes of magnitude = 4.5 or greater take place along plate boundaries in just a year) (Johnston, A.C. and Kanter, L.R., 1990, Earthquakes in stable continental shelf. *Scientific American*, 262(3):68-75). The Kutch is not at the edge of any continental plate and the tremor took place on June 16, 1819 in areas of very old faulting which had been stabilized for millions of years. Aftershocks lasted until November 20th or later the following year. The quake generated dramatic changes in the landscape. About 7000 houses, the fort and palace at Bhuj were destroyed. At Sindree, where the Phurraun branch of the Sindhu drains into the Great Rann of Kutch, the brick fort there was inundated by a torrent of water from the ocean and a lake 32 miles long was created. North of Sindree, a roll of earth was raised six to eight metres high over a length of 120 km. (Johnston and Kanter, 1990: 72). The Allah Dam was 25 km. broad. The Sindhu River finally in 1826 cut through this Dam. Tectonics may also have caused the drying up of the Nal Sarovar. It should be noted that the archaeological site of Lothal (at the mouth of Sabarmati River) is located within the Nal Depression; thus, Lothal is at one end of the communication link which extended from Har-ki-dun glacier in the Himalayas to Somnath, all along the mighty Sarasvati River. There is a possibility that the sea level near Lothal was two to six metres higher during ca. 3000-1500 BC. (Gupta, S.K., 1977, Quaternary sea-level changes on the Saurashtra coast. In, D.P. Agrawal and B.M. Pande, eds., *Ecology and Archaeology of Western India*. Delhi: Concept P:ublishing: 181-94).

“This should be called the Sarasvati Valley Civilisation, not the Indus Valley Civilisation," says K.S. Valdiya, a geologist from the Jawaharlal Nehru Centre of Advanced Sciences and Research, Bangalore, for whom the search for the Sarasvati has been a passion for close to 30 years now. Formerly director of the Wadia Institute for Himalayan Geology in Dehradun, Valdiya too is trying to put together

a multi-disciplinary, multi-institutional team of scientists to help find the river. " (***India Today***, September 28, 1998, Science: Legacy, Search for the Sarasvati by Rohit Parihar and Samar Halamkar).

Many challenges lie ahead in completing the rejuvenation of the Sarasvati River Basin from Har-ki-dun glacier in W. Garhwal upto Somnath, Gujarat stretched over four ecological zones: receding Himalayan glaciers, Siwalik foothills, semi-arid Marusthali and marshy Rann of Kutch and Saurashtra. The ambitious project profile includes: a comprehensive design of the NW India Drainage System and review of land-use patterns and afforestation programmes (including growing of halophytes—salt-resistant cash crops such as Salicornia brachiata), action to stop the receding glaciers in Uttar Pradesh (W. Garhwal) and Himachal Pradesh, resolving water-logging problems in Haryana and Punjab, recharging of the groundwater resources in Rajasthan and Kutch by extending the Rajasthan Canal beyond Jodhpur, using the waters of the Rajasthan Canal (which draws the waters from the perennial source of Sutlej – Manasarovar)—to recharge the groundwater resources, provision of additional wells in the entire Basin, use of solar and wind-power to power the pumpsets for tubewells, and, improvement of subsurface drainage system in the entire Sarasvati River Basin. Conjunctive development of watershed projects in Rajasthan and Gujarat using the groundwater resources and recharge facilities using perennial surface waters will be essential to evolve changes in the land-use patterns in the region and to provide the basic need of drinking water facilities in the semi-arid and marshy ecological zones of Bharat.

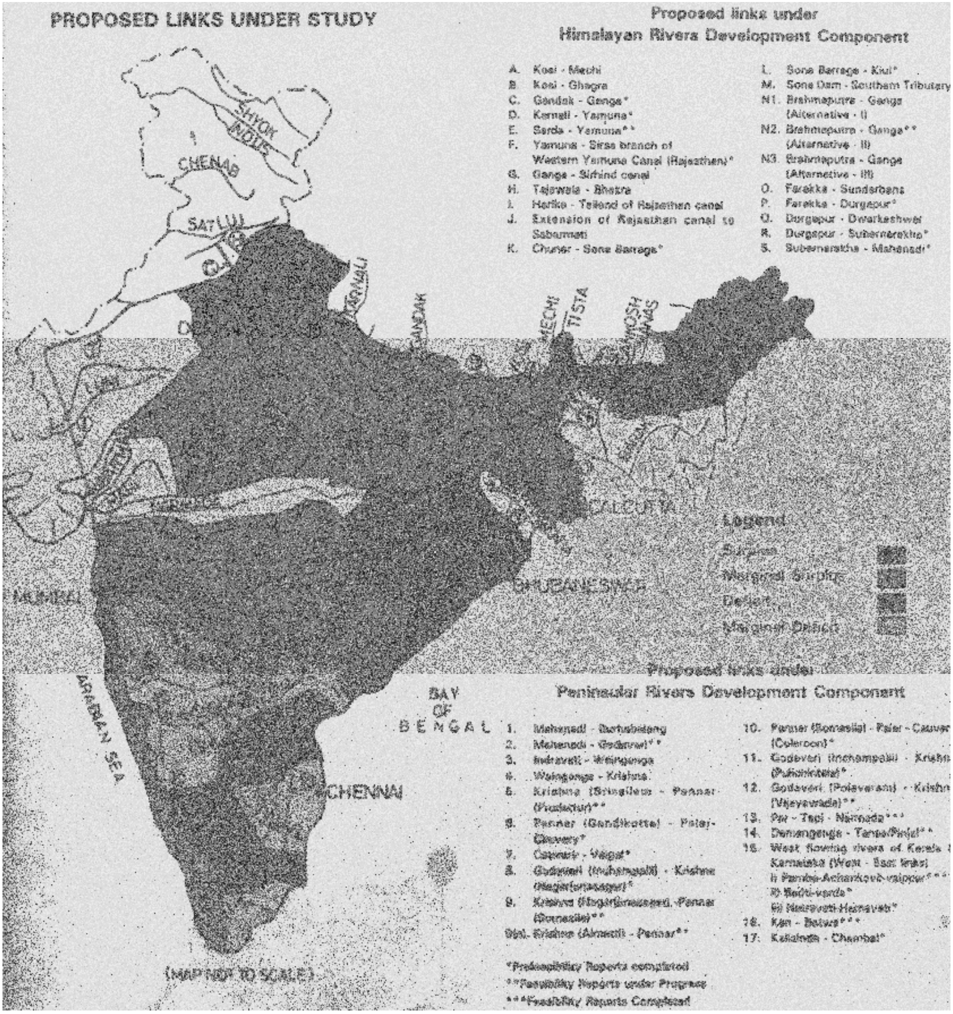
To effectively regulate the implementation, in an integrated manner, of the range of projects in complex ecological zones and some zones subject to tectonic disturbances, it is essential to constitute a Sarasvati River Basin Authority.

Sarasvati, the mother, nurtured on her river-banks a bronze-age civilization dated ca. from 3500 BC and which is a continuing cultural tradition since then in Bharat.

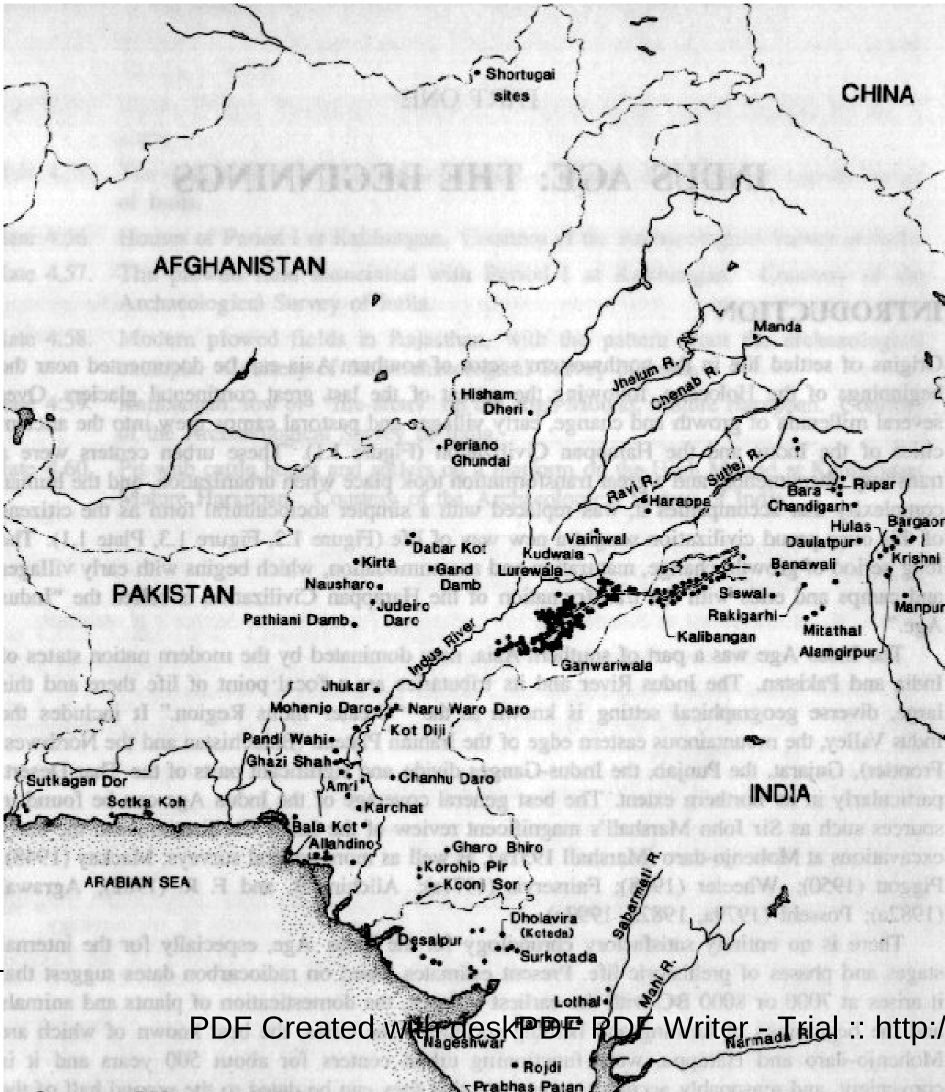
It is easy to determine the recent (in geological time) palaeo-courses of the River Sarasvati by simply mapping the over 2,600 archaeological sites of the so-called Harappan civilization, on the world map. The clusters of nearly 2,000 of these archaeological sites will be found on the banks of the now-desiccated River Sarasvati or in the river basin, now seen with dry river beds and remnants of lakes in many places and groundwater aquifers stretching all along the Marusthali_ desert, the Rann of Kutch, the Nal Sarovar below the Little Rann of Kutch and the Saurashtra .peninsula. The clustering of the sites is more dense on the Sarasvati River Basin: from Rupar in the North to Prabhas Patan in the South. The sites of Naru Waro Daro, Kot Diji, Chanhu-daro, Gharo bhiro, Korohio pir, Koonj Sor, Dholavira (Kotada), Surkotada, Lothal, Rangpur, Rojdi and Somnath (Prabhas Patan) seem to define the course of the Sarasvati River in Sindh and Gujarat.

The ground-truth of the early courses of the River Sarasvati of the days of the R.gveda has been confirmed using scientific techniques: satellite images, carbon-14 dating, tritium analysis of water samples from deep-wells all along the paleo-channels shown on the satellite images. These have helped in establishing that the river was a mighty one even prior to 3500 BC and was desiccated between ca. 1900 to 1500 BC.

Map showing the contours of proposed channels for inter-basin transfers of waters among the Himalayan and Peninsular rivers of Bha_rat (National Water Development Agency, November, 1996).



Locus of the Sarasvati River Basin by mapping the archaeological sites



Principal archaelogical sites of the Sarasvati-Sindhu River Basins (After Gregory L. Possehl, 1999, *Indus Age: The Beginnings*, New Delhi, Oxford and IBH Publishing Co., Fig. 1.1)

The River Sarasvati was desiccated due to a number of geological reasons: Yamuna (called Chambal earlier) cut a deeper channel and captured the tributary of Sarasvati (Tons River) at Paonta Sahib (Himachal Pradesh, a famous Sikh pilgrimage centre). Hence, the cherished memories of the people of Triven.i San:gamam at Prayag (Allahabad) where Yamuna brought in the waters of the Sarasvati to join the Ganga river. Sutlej (which originated from Mansarovar lake in Mt. Kailas, Tibet) which was a tributary of Sarasvati river, joining the latter at Shatrana (Punjab), took a 90-degree turn at Ropar (due to tectonic disturbances) and migrated away from the Sarasvati and joined the Sindhu (Indus) river. The phenomenon called a_ndhi (sand-storms) which is common even today, resulted in the build-up of sand-dunes on the bed of the Sarasvati River in the areas close to Jaisalmer (Thar or Marusthali_ desert, also called Cholistan in Pakistan area). Thus Sarasvati River got choked up and lost the perennial waters coming from the Har-ki-dun glacier (Bandarpunch massif, W. Garhwal, Himalayas). When the river got desiccated, many people moved towards the Ganga-Yamuna doab and moved south towards the Godavari River (there is an archaeological site called Daimabad, on Pravara river, a tributary of Godavari, near Nasik).

River Tons (Tamasa) and River Giri originate from Har-ki-dun glacier and constitute a combined glacial stream, north of Paonta Saheb in Himachal Pradesh, to become a tributary of River Sarasvati_, together with River Sutlej which constitutes the anchorage glacial river of Sarasvati_. People of Bha_rata used the water of this river for drinking. (MBh. Bhi_s.ma Parva Ch. 9, Verse 3). According to the Ra_ma_yan.a, the rivers Tamasa_ and Ja_hnavi_ flowed side by side. Ta_masi_ (Ku_rma P. I. 47.32) is sourced in the R.ks.a mountain (Matysya P. 114.25). Ra_ma halted on the banks of Tamasa_ which was not far from Gan:ga_ and after crossing the river he reached the river S’ri_mati_. Das’aratha decorated

the bank of this river, which was crowded with ascetics, by erecting many sacrificial posts. (Ra_ma_. Ba_la. 2.3-6; Raghuvam.s'a 9.20-72). It flows 12 miles to the west of Sarayu_, a river which originated a little to the north-east of the source of the Gan:ga_ in the Kumaun mountain. The bank of this river is associated with the early life of Va_lmi_ki. (Ra_ma_. Ba_la. Ch.2). The river bank was the scene of the episode of the kraun~ca birds and the famous curse of Va_lmi_ki beginning with 'ma_ nis.a_da'. (Ra_ma_. Ba_la ka_n.d.a, Sarga 2). The junction of the Tamasa_ with the Yamuna_ near the Sirmur frontier was the place where Ekavi_ra (also called Haihaya), the progenitor of the Haihaya dynasty and the grandfather of Ka_rtavi_rya_rjuna, was born. (Devi_bha_gavata. VI. Ch. 18-23). Close to Tamasa_ (Tons) river is the Giri river, which also raises from the Rupin and Supin glaciers in the Har-ki-dun glacier. Girigahvara is a place of habitation on the north-eastern side of Bha_rata. (MBh. Bhi_s.ma Parva, Ch. 9, Verse 42). [Ja_hnavi_ = Gan:ga_. The legend is that Ajami_d.ha had three wives, Dhu_mini_, Ni_li_ and Kes'ini_. R.ks.a was born from Dhu_mini_, Dus.yanta and Parames.t.hi from Ni_li_ and Jahnu from Kes'ini_. The descendants of Jahnu were Kus'ikas. (Jahnu's on was Bala_ka_s'va whose son was Kus'ika). The river Gan:ga_ submerged the hermitage of Jahnu when he was performing penance. Jahnu became angry and drank up the river Gan:ga_. Bhagi_ratha entreated Jahnu who pushed Gan:ga_devi_ out through his ear. Hence, Gan:ga_ got the name Ja_hnavi_].

Balarama, elder brother of Kris.n.a goes on a pilgrimage along the Sarasvati River from Dwaraka to Mathura, after visiting Plaks.apras'ravan.a and Yamunotri (Ka_ra_pacava). During the pilgrimage, he offers homage to his ancestors. (Even at this time, the river was navigable for a distance of 1600 km. from Paonta Saheb thru Lothal/Dwaraka to Somnath (Prabhas Patan). The pilgrimage along the Sarasvati River is described in great detail in the s'alya parva of the Maha_bharata. So, our epics do contain valuable historical, geographical information of ancient Bharat.

So, we have to re-evaluate the history of our ancient civilization.

The Sarasvati civilization which evolved earlier than ca. 7000 BC (Mehergarh in Afghanistan and many chalcolithic sites in the Sarasvati River Basin in Bharat) and continued in an uninterrupted cultural sequence right upto 1000 BC in Northwest India is characterized by typical stamp seals with inscriptions, etched carnelian beads, cubical binary and decimal series of weights and other artifacts such as: inlays, cosmetic equipment and bronze-age weapons. Many artifacts are compared with the finds in the Akkadian Dynasty (2334-2154 BC) of the Mesopotamian civilization, making this period the phase of intense external trade contacts during the mature phase of the evolution of the civilization. The discoveries of the last 70 years have rendered the following prediction remarkably accurate:

> "If there is one region of the world where the existence of a human or pre-human form may one day be demonstrated, it is Southern Asia, which was once vaster than it is today and where life has always been so prolific… Prehistoric anthropological investigations in India have a splendid future before them." (H.V. Vallois).

The dawn of urbanization and transition from agrarian economy to an economy dominated by artisans, are vividly reconstructed from the archaeological finds of the Sarasvati-Sindhu doab civilization which may also be called the Sarasvati_ civilization. A pen picture with exquisite photographs is provided in the Age of God-Kings:

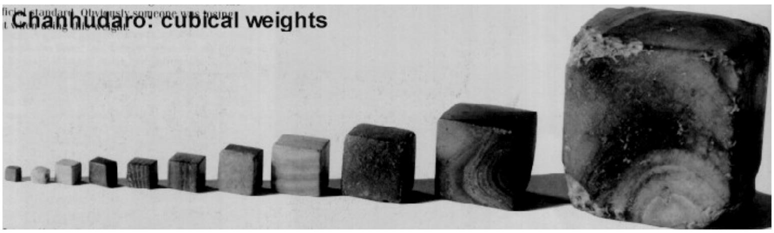
"About 2500 BC, a people of unknown origin started constructing a series of cities as remarkable as any the world had yet seen. Artisans set to work, trade flourished and a system of writing evolved. At its apogee, the Indus (Sarasvati-Sindhu) civilization encompassed nearly 1.3 million square kilometers; its boundaries stretched from the foothills of the Himalayas to the Arabian Sea and from the Ganges watershed to the Gulf of Bombay, just to the north of what is now Bombay. It was the largest cultural domain of its era... This people also perfected the art of casting objects in bronze, a breakthrough in technology that ranks among

humankind's greatest early achievements... The pictographic script of the Indus (Sarasvati-Sindhu) people has not yet been successfully deciphered. The Southeast Asian rice farmers seem not to have developed a system of writing... the Indus (Sarasvati-Sindhu) people... built grand cities, centers of production and trade... One of these cities... Harappa (Sarasvati-Sindhu)... around 2300 BC, Harappa (Sarasvati-Sindhu) was home to 35,000 people... Another great city took shape 550 kilometers to the south, on the lower Indus (Sarasvati-Sindhu)... Mohenjo-Daro -- 'Hill of the Dead' in Sindhi... Two gateways provided access through the wall. Within the citadel were assembly halls, administrative offices and a number of residences for various officials and functionaries. Only an enormous collective effort could have created these two great urban centers of the Indus (Sarasvati-Sindhu) culture... The huge complexes at Mohenjo-Daro and Harappa (Sarasvati-Sindhu) that are believed to be municipal granaries covered thousand upon thousand of square meters. They had raised brick floors... and strong, timbered roofs to protect against the weather. The apparent threshing areas nearby were paved in brick and included circular pits where workers pounded the kernels with wooden staves to remove the husks from the grain... The harvest was probably a state monopoly, and the granaries served, in effect, as state treasuries... They were the world's first people to grow cotton and to weave its fibre into textiles... Trading posts were established far beyond the valley's fringes. The Indus (Sarasvati-Sindhu) people founded a settlement at Sutkagen Dor, west of Baluchistan and within reach of the Persian Gulf. Sutkagendor is the westernmost of the Mature Harappan sites and is located in the Dasht Valley of the Makran coast, about 35 kms. of the modern border between Iran and Pakistan. At this site was discovered a house made of burnt bricks, with dimensions close to the bricks of Mohenjodaro. ‘Everywhere charcoal, bones (principally of fish), pottery and stone knives were found, but nothing else… Fragments of pottery were imbedded (sic) even in the very lowest walls; and below their foundation, stone knives, bone, and pieces of copper were met with in great quantities.’ (Mockler, E., Major, 1877, On ruins in Makran, *Journal of the Royal Asiatic Society of Great Britain and Ireland*, 9: 121-34). On the significance of the name, Sutkagendor, Stein notes: “I may take this opportunity to record that the proper pronunciation of the local name as now head

from nomadic Baluch of the neighborhood was Sutkagen-dor (as also given by Major Mockler 1877: 122), from sutka 'burnt' prevailing in the local Baluch dialect over sukta as the equivalent of Persin sukhta. The name owes its origin to the red coloring which the great amount of well-burnt potsherds strewing the ground gives to the whole site as seen from a distance" (Stein, Aurel, 1937, *Archaeological Reconnaissances in North-Western India and South-Eastern Iran*, London, Macmillan and Company: 71). The word sutka is cognate with the lexemes of many Indian languages: cut.u = to be hot, burn (Ta.); cut.ar = fire (Ma.); sud.ale = burning a dead body (Tu.); cu_d. in upacu_d.ana = searing, heating (Skt.); cud.uli_ = torch (Pkt.); cud.i_= torch of wisps or twigs (M.); sugd- = roasting (Kui)(DEDR 2654).

Merchants used sets of cubical stone weights that never varied in value throughout the Indus (Sarasvati-Sindhu) region. The basic unit was 16, equal to 14 grams.

Chanhudaro: chert, agate, cubical weights in graduated sizes, ranging from 0.856 grams; the most common weight is 13.7 grams which is the 16^{th} ratio. Larger weights are in decimal scale; the largest weight is 100 times the standard weight of 13.7 grams. At Chanhudaro, the largest cubical weight weighed 1330.68 grams (about 40 gms. Short of the official standard, which was used in all the settlements). [max. width 8.6 cm.; Boston, Museum of Fine Arts; Mackay, 1943: 239-46, pl. XCI 29-32; Kenoyer, J.M., 1998, cat. No. 40; Joint Expedition of the American School of Indic and Iranian Studies and the Museum of Fine Arts, 1935-1936).



The larger weights were multiples of 16 -- 32,64,128, and so on up to 12,800 (11 kilograms); the smaller ones were all fractions of 16... The Indus (Sarasvati-

Sindhu) merchants, like their Sumerian counterparts, developed a method of record keeping and used carved stone seals to stamp their property. Every mercantile family had its own device, and probably every important citizen did also. More than 2,000 examples have been found in the Indus (Sarasvati-Sindhu) cities, and others have turned up in Mesopotamia, left there by overseas traders... One popular motif appears to have been a unicorn sniffing at an incense burner. The unicorn is probably a bull in profile, so that one horn hides the other. But why the creature has been offered incense is a puzzlement. In a seal from Mohenjo-Daro, both the unicorn and the incense brazier are being carried aloft in some kind of procession... the Indus (Sarasvati-Sindhu) tongue is lost in antiquity and none of the signs (on seals) corresponds to any used by the Egyptians or Sumerians. The seal inscriptions are brief -- one or two lines... The Indus (Sarasvati-Sindhu) people left no surviving histories, no religious texts, no literary epics... (Harappa (Sarasvati-Sindhu)n merchants used the seals as a kind of trademark impressing them on clay tags to label their goods)... after each catastrophe (earthquake or flood), the citizens picked up their lives again. Some sections of Mohenjo-Daro were rebuilt as many as eight times. In each reconstruction, the architects re-created the previous construction virtually brick for brick... Sometime during the nineteenth century BC, however, the Indus (Sarasvati-Sindhu) cities began to slip into permanent decline... Scribes in Mesopotamia recorded rich shipments from the Sarasvati-Sindhu doab until around 1800 BC, when they suddenly ceased... The urban heritage was passed on to the east... somber notes of Harappa (Sarasvati-Sindhu)n ideology would continue to reverberate through the coming centuries." (The Age of God-kings, 3000-1500 B.C., Amsterdam, Time-Life Books, 1991, pp. 129-141).

Sarasvati civilization was the most expansive civilization of its times starting from ca. 7000 BC and until ca. 1000 BC. In Bharat, the civilization finds its continuity, exemplified by the Bha_rati_ya cultural traditions, a veritable legacy of the modes of living described in the Vedic texts and a living testimony to the evidence of arts and crafts of the copper and bronze ages, found in thousands of archaeological sites.

The Croats (of erstwhile Yugoslavia) claim that they are 'sarasvats'! The Behistun (Iran) inscription of Darius does refer to the region called Hravat (Haraquaiti) which is a phonetic transform from Sarasvati. Sarasvati—Haraquaiti—Hravat-Kravat-Croat! They have URLs linked with the Sarasvati website on the internet: http://sarasvati.simplenet.com

Section 2 River Sarasvati: ground-truth

Earth sciences: geology, glaciology and hydrology; discovery of River Sarasvati

The participation of the scientific community in establishing the ground-truth of River Sarasvati is highlighted by the February 1999 publication of Geological Society of India, Bangalore, of a book titled *Vedic Sarasvati* describing the palaeodrainage system of North West India. A number of organizations are involved in the research and project work:National Remote Sensing Agency, Geological Society of India, Bhabha Atomic Research Centre, Central Water Commission, State Water Resources Agencies, Central Arid Zone Research Institute, Central Arid Zone Forest Research Institute, Indian Space Research Organization. Satellite images from LANDSAT, EOSAT, IRS 1-A to 1-D have been put to extensive use in the research studies.

Global atlas of palaeo-vegetation since the last glacial maximum

Glaciological and palaeo-vegetation studies and maps have established the fact that about 18,000 and 8,000 years ago, Northwest India was a moist region; the region could have supported a developing, maritime, riverine civilization. The region covered by the Sindhu and Sarasvati River Basins and the rest of India and South-east Asia, could have supported a continuing civilization from ca. 18000 since the region was not covered by ice sheets (unlike the rest of the Asian continent) and had a pattern of vegetation with grasslands to support the settlements of people and cattle.

The following analyses of the glacial age and the vegetation maps of periods from 18000 C14 years BP are drawn from the following websites:

http://www.soton.ac.uk/~tjms/eurasia.html

http://www.esd.ornl.gov/projects/qen/nerc.html (Quaternary Environments Network)

Indo-European Languages and farming

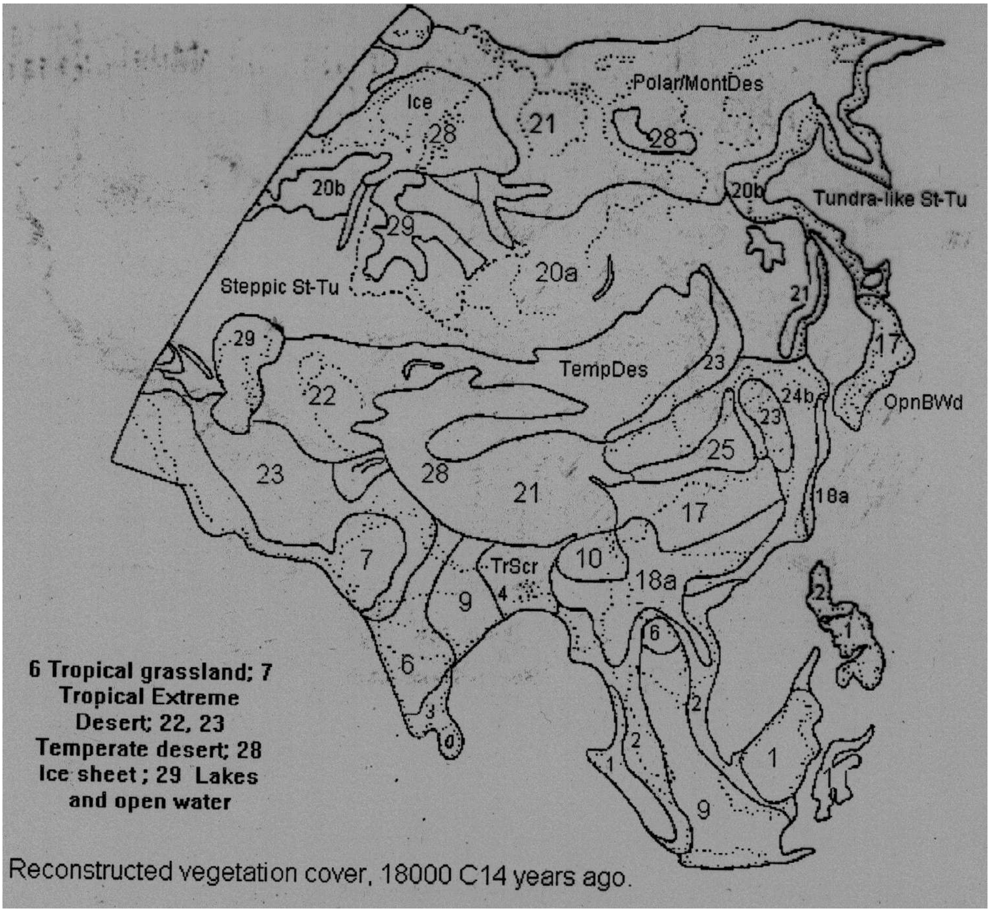
Jonathan Adams, MS 6335, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA (e-mail; Jonathan@elvis.esd.ornl.gov) and Marcel Otte, Université de Liège, Service de Préhistoire, place du XX Août 7, Bâtiment A1, 4000 Liège, Belgium. (e-mail; prehist@ulg.ac.be)

Abstract: The late Glacial record of vegetation and climate suggests that major changes in hunter-gatherer population density might have occurred across Europe and Asia as a result of extreme climate fluctuations. We hypothesise that a reduction in population density across most of the region during the coldest part of the Younger Dryas (around 12,800-11,400 cal. y.a.) may have been followed by a sudden rebound phase, when climate switched back to warm, moist Holocene conditions over only a few decades. A 'sparse wave' of hunter-gatherers migrating rapidly out of a refugial area (possibly located in southern Europe and/or the Near East) would have made a disproportionate contribution to the genetic and linguistic legacy of the region. This may explain part of the initial prehistoric dispersal pattern of the Indo-European languages. Other smaller and somewhat later climate changes, such as the cold event at 8,200 cal. y.a., are also candidates for this process of regional depopulation followed by repopulation from a restricted source region. The possibility should be considered in addition to hypotheses invoking spread of these languages by early farmers or warlike cultures. Key words: Archaeology, Palaeoenvironment, Linguistics, Indo-European. [In press; *Current Anthropology*]

The maps presented at the website are based on inter-disciplinary interpretation of evidence from plant fossils, together with zoological evidence, soil and

sedimentological analyses which also have some bearing on vegetation cover. The approach has been to review current literature and liase with experts from each region (acknowledged within the text). Given the scope of the task, regional review sources and published maps have been an important source of information, with less emphasis placed on consulting every published paper on each region (of which there are many thousands). In many areas, the evidence is sparsely distributed and the map reconstructions presented here should only be regarded as tentative. Summaries of the evidence from each region are presented, in order to give some impression of the quality of data currently available, and the present disagreements within the literature. It is to be expected that as further evidence accumulates over the coming years, significant revisions to these maps will become necessary. [The list of references for the documents of the QEN website runs to nearly 53 pages and is omitted here].

Key to the vegetation scheme used in this map and other maps shown at the



website:

The use of any vegetation categories used to represent the world of the distant past is a risky business, as one can never be absolutely certain what the vegetation was really like in structural terms, and one often knows that it had certain attributes of

floristic composition that do not occur today. However, it does still seem worthwhile trying to narrow down the unnecessary confusion and loss of information that is a continual problem for Quaternary ecologists. Different workers use different labels when they each talk of essentially very similar vegetation types. For example, what one person in North America describes as 'desert' may be what another in Africa would include in the category of 'steppe'. Only if they each give additional details of the structure and physiognomy of the vegetation that they have in mind will they both be certain when they are talking about the same thing. For the purposes of clarification, some general details are given here to show what is to be bourne 'in mind' for each of the map categories. In using this scheme, considerable efforts have been made to push the diverse range of literature sources on Quaternary palaeovegetation into a coherent framework. Most importantly, the editor has endeavored to ensure its use by showing this scheme to local/regional experts when asking for their opinions on the palaeovegetation maps.

Amongst the many unknowns of the world of the past, it is also possible that vegetation-climate relationships might have changed somewhat (e.g. due to changed CO2 levels), in which case the temperature limits might not be as appropriate as they are today. Thus, one could suggest that the limit of rainforest at the LGM might (purely hypothetically) in fact have been 20 deg. C for the coldest month, rather than 15.5 deg. C as for the present. The scheme presented here is based on a general knowledge of the literature on plant biogeography, applied to a specific and urgent taSkanda This scheme is thus ad hoc and imperfect, but it is hoped that it will have at least some role in reducing the amount of confusion that currently exists within the literature concerning Quaternary palaeovegetation.

Detailed key to vegetation types

Detailed key to vegetation types, corresponding to numbers on regional maps. A brief description of the physiognomy of each vegetation type is given, together with the nearest corresponding vegetation type/s on the global map of Olson et al. (1983). Note that the descriptions of cover are partly based on a concept of 'cover

strata', selectively taking the percentage cover above a particular horizontal plane, as if the leaves and branches above it were casting down a shadow onto this imaginary plane. This principle is illustrated in the figure shown below. The approximate height and cover values used here are not arbitrary; they have been checked with a range of vegetation scientists and are based on those presented by J.M. Adams at a UNEP workshop in Charlottesville in January 1991. They were generally accepted at the workshop as being 'representative' cover values for each major vegetation category. The temperature limit for desert and and semi-desert is taken to correspond approximately to the geographical limit for 'hot and warm desert' presented on the Olson et al. (1983) ecosystems map, and used as a basis for their carbon storage categories; for our palaeovegetation maps this limit is assigned using estimates of the land temperature depression in each region. 'Subcategories' are also given to enable the more specific subdivision of vegetation types if the data appear to allow this. Not all of these are utilized in the regional maps presented here, because the resolution in the fossil record is not always seen to justify this.

Tropical and subtropical. (mean temperature of coldest month about 15.5 deg. C for forest vegetation, and mean temperature of coldest month above 10 deg. C for all other physiognomic types).

1. Tropical rainforest (evergreen or semi-evergreen forest of humid tropics, usually tall) (corresponds to Olson seasonal tropical forest and broad-leaved humid forest. Also includes swamp forest).

Leaf cover above a level 8m off ground, >50% . No more that 50% loss of canopy leaf cover at any one time during average year.

(1a= Rainforest of well-drained soils <25% loss of canopy leaf cover, 1b=semi-evergreen forest 25-50% loss of canopy leaf cover,

2. Monsoon or dry forest (medium height, deciduous or mainly deciduous forest of warm climates) (not corresponding to an Olson category; approximately a sub-division of seasonal tropical forest)

Leaf /branch cover above a level 8m off the ground, >50% during peak month of leafiness. >50% loss of canopy leaf cover at some stage in average year, except for Australian Eucalyptus dry forests, where limit of rainforest is defined by where Eucalyptus becomes >50% of canopy.

3. Tropical woodland (relatively low, open tree canopy, usually deciduous) (Corresponds to subdivision of Olson tropical savanna and woodland;).Leaf /branch cover above 8m off ground, 50%-20%.

4. Tropical thorn scrub and scrub woodland (low, woody, usually deciduous) (Incorporates Olson succulent and thorn woods, and also overlaps with warm or hot shrub and grassland) Leaf /crown cover above 8m off ground less than 20%, but total leaf cover between 0.8-8m off ground greater than 20%.

5. Tropical semi-desert (sparse scrub or sparse grassland) (Corresponds to subdivision of Olson desert and semi-desert)

Less than 2% vegetation cover above 80cm off the ground. 25-4% vegetation cover between 0 and 80cm off the ground, during an average year.

6. Tropical grassland (fairly closed grassland without many trees or shrubs) (Corresponds to subdivision of Olson tropical savanna and woodland, and overlaps with warm or hot shrub and grassland)

(6a= dense sward tropical grasslands, 6b= sparse sward tropical grasslands)

Leaf/branch cover above 80cm off ground less than 2%. But total cover above ground level, greater than 25%.

7. Tropical extreme desert (very sparse vegetation, or completely barren) (Corresponds to subdivision of Olson desert and semi-desert)

Total cover above ground level, less than 4% at any time during average year.

9. Savanna (dense grassland with a scattering of trees and/or bushes) (subdiv of Olson tropical savvanna & woodland).

(9a=Tree-dominated savanna, 9b=bush-dominated savanna)

Leaf/branch cover above 60cm of the ground, 2-20%.

Higher latitude and montane (mean temperature of coldest month below 10░C, or below 15.5░Cfor forest vegetation).

10. Broadleaved temperate evergreen forest (fairly tall, many broadleaved evergreen/semi-deciduous angiosperm trees but conifers also tend to be abundant, in moist climate). (Corresponds to subdivision of Olson temperate broadleaved forest)

(1a= temperate broadleaved evergreen forest on well-drained soils, 2b= same, but as swamp forest)

Cover above 8m off ground, greater than 50%.

11. Cool temperate giant coniferous rainforest (very tall, closed conifer forest; usually Pseudotsuga or Seqouia) (Subdivision of Olson southern continental taiga)

Greater than 50% cover above 40m off ground.

12. Montane tropical forest (evergreen, adapted to cool temperatures) (not corresponding to an Olson category)

(12a=lower montane forest, 12b=upper montane forest).

13. Mediterranean sclerophyll woodland or forest (mixture of sclerophyllous and deciduous trees & bushes) (Corresponds to a subdivision of mediterranean types of Olson)

(13a= Med sclerophyll forest or woodland, 13b= Med sclerophyll scrub)

14. Temperate deciduous broadleaved forest (closed forest. Includes mixed conifer-broadlaved forest) (Corresponds to subdivision of Olson temperate broadleaved forest)

Cover above 8m greater than 50%. Less than 50% cover by needle-leaf trees. Greater than 50% ofbroadleaved leaves lost in winter.

15. Southern taiga (needle-leaf conifers, tall, very dense canopy cover) (Corresponds to southern taiga of Olson)

Cover above 8m greater than 90%. Greater than 50% conifer cover.

16. Mid taiga (conifer or broadleaved forest with a relatively open canopy) (Corresponds to Olson main taiga)

(16a=main taiga on well-drained soils, 16b = main taiga on bog or swampy soils; not distinguished here) Cover above 8m 50-90 %.

17. Open boreal woodlands (various open woody vegetation types; coniferous or broadleaved) (Corresponds to Olson northern & maritime taiga)

Cover above 8m, 20-50%.

18. Semi-arid temperate woodland or scrub (various open woody vegetation types; coniferous or broadleaved, in temperate climates). (Corresponds to Olson warm conifer and other woodlands)

(18a = temperate woodland, 18b = temperate scrub).

Cover above 8m, less than 20%. Cover 0.8-8m, above 20%.

19. Tundra (mainly herbaceous or with low shrubs) (Corresponds to Olson tundra, but also includes herbaceous bogs).

(19a = sparse tundra, alpine and high polar 19b=dense tundra)

Cover above 80cm, less than 2%. Cover above ground level, greater than 4%.

(15a; sparse tundra - 4-25% ground cover. 15b; dense tundra - 4-25% ground cover.)

20 Steppe-tundra (a no-analog glacial age vegetation, probably sparse vegetation, herbaceous with a few low shrubs. Resembling both present-day steppe and tundra in certain aspects)

(No Olson analogue)

(20a = 'tundra-like' relatively rich in tundra plants 20b = 'steppe-like' richer in steppe plants). Vegetation cover 10-50%? Highest in moister 'tundra-like' areas, lower in dry 'steppe-like' areas. (estimated by analogy with present-day plant communities in various regions, on basis of pollen, palaeosoil and geomorphological evidence).

21. Polar and alpine desert (very sparsely vegetated with only low herbaceous plants) (Corresponds to Olson polar or rock desert)

Vegetation cover less than 4%.

22. Temperate desert (very sparsely vegetated, cold winters) (Subdivision of Olson cool desert and semi-desert types)

Vegetation cover less than 4%.

23. Temperate semi-desert (sparse shrubland or grassland) (Subdivision of Olson desert and semi-desert)

(23a=grassy temperate semi-desert, 23b= shrub-dominated temperate semi-desert; not distinguished here)

Less than 2% cover above 60cm off the ground. 4-25% total above ground cover.

24. Temperate and montane steppe (grasslands and other herb-lands, closed or fairly dense sward) (Corresponds to subdivision of Olson cool grassland/scrub)

(24b=sparser, short-grass steppe, 21a=dense tall-grass steppe)

Leaf/branch cover above 80cm less than 2%. Vegetation cover above ground, greater than 25%.

25. Forest steppe (mainly herbaceous, but with clumps of trees or bushes in favourable pockets) (Corresponds to subdivision of Olson wooded tundra and timberline. Also includes wooded bogs)

(25a = moister climate types, closed herbaceous vegetation, 25b = drier climate types, open herbaceous vegetation; not distinguished here).

2-20% leaf/branch cover above 60cm, on a broad scale.

26. Forest tundra (mainly herbaceous or low shrub, with a scattering of trees and bushes). (Corresponds to a subdivision of Olson wooded tundra and timberline).

2-20% leaf/branch cover above a level 60cm off ground, on a broad scale.

27. Bog/swamp (of tropical or high latitude zones) (>50% surface water cover for 6 months or more of year). (corresponds to Olson Swamp and Bog).

27a) herbaceous bog 27b) wooded bog 27c) swamp forest forest growing on soils with >50% surface water cover for 6 months or more of year, (not distinguished here)

28. Ice sheet and other permanent ice.

29. Lakes and open water.

(29a=fresh water, 29b=saline water)

(See Preliminary land ecosystem map of the Eurasia since the Last Glacial Maximum: Summary map of vegetation cover at 18,000 14C years BP). This map illustrates the aridity of full-glacial conditions suggested on the basis of palaeoevidence from around the world; there was much less closed forest and more desert than at present. In fact, current evidence from various parts of the world suggests that the greatest overall aridity was reached slightly after 18,000 14C y.a., and closer to 16,000-14,000 BP. In this sense, the map may be more appropriate as a representation of conditions slightly after the LGM. Nevertheless, the whole

period from about 21,000- 14,000 14C y.a. seems to have experienced much colder and more arid conditions than at present.}

About 8000 years Before Present : Southern and Eastern Asia 8,000 years ago (in radiocarbon chronology, early Holocene)

Sea Level. Given that relative sea level was still lower than present in some parts of the world, partly due to the remaining parts of the Laurentide ice sheet, it is likely that coastline in many areas of southern Asia extended slightly further seawards than at present. However no maps seem to be available for this time slice at 8,000 B.P., so present-day coastlines are illustrated here. In the Yellow River delta of China, in contrast, relative sea level seems to have been higher than today (possibly due to a legacy of reduced sediment build-up during the preceding glacial phase). Here, the sea apparently came in 80-100 km further inland than now, between 8,000 and 5,000 years ago (Yang & Wang 1990).

Moister and warmer than present, across the monsoon belt. At 8,000 years ago, the south Asian region in general seems to have been strikingly moister and slightly warmer than at present. The greater moistness fits in with a general pattern extending across into northern Africa, reflecting greater summer monsoon rainfall at that time. Lake level evidence over all of China and Mongolia shows conditions moister than present between around 9,500 and 5,000 years ago (e.g. reviewed by Winkler & Wang 1993, Petit-Maire et al. 1994). However, Gasse & Van Campo (1994) find evidence from lakes in Tibet and Rajasthan of a major dry phase somewhere between around 8,000 and 7,000 years ago. This probably extended across much of the monsoon belt, as they note that it also shows up in lake levels across west Africa. However, my reconstructions here assume the 'background' moister state occurred at the 8,000 years ago time slice itself.

Moister in NW India. Likewise, in North-western India (Rajasthan) there is lake level, anthropological and other evidence of higher-than-present rainfall at around 5,000 years ago (Bryson & Swain 1981). Alekseeva (1991) suggests on the basis of

palaeochannels of rivers that precipitation in winter exceeded the present by about 200-300mm at around 5,000-4,000 years ago. A figure of 500mm greater is suggested by Singh et al. (1974), who on the basis of plant fossils and the molluscan fauna reconstruct a savanna-grass steppe environment for Rajasthan at that time, in contrast to the present semi-desert. Hyams (1976, p.69) mentions vertebrate fossil evidence from Sind, in the lower Indus Valley, indicating a rainforest or rainforest-savanna environment during the mid-Holocene (though the forest was presumably restricted to riverine borders). The original source material that Hyam cites has not yet been obtainable. To the north-west of this area, in southern Haryana, much moister-than-present conditions are also indicated by palaeolake levels (Bhatia & Singh 1988).

India. Moister than present. There are various sources of evidence (lake level, sea surface salinity, alluvial sedimentation) showing peaks of humidity in northern and western India at around 11,000-10,000 years ago and 7,600-6,000 years ago (e.g. Van Campo 1986, Petit-Maire et al. 1994), but still much moister than present at around 8,000 years ago. However, there do not appear to be any clear indications of the vegetation conditions at that time. The most direct information relating to the ecology appears to be from the assemblages of early-to-mid Holocene animal bones from an archaeological site at Mohenjo-daro in the Sind region at the western edge of the Thar Desert (Hyams 1976, p.69), in the lower Indus valley. The Sind presently has a tamarisk and scrub vegetation and a rainfall of around 150mm. The diverse Holocene vertebrate fauna seems to indicate, in contrast, either humid park-land or rainforest, with annual rainfall of at least 1200 mm. It is unfortunate that Hyams only mentions this information in passing, without giving details of the dating of this fauna, nor the literature sources that he has used (except to say that the information is from Piggott op. cit.).

From cores taken in the Indian Ocean, there is evidence of a stronger-than-present monsoon flow over the Indian region (Van Campo 1986), which would be expected to have given moister conditions at 8,000 years ago, although no quantitative

estimates of the rainfall change are available.

Rainfall in Gujarat 1901-50

	Mean	**80%**
Ahmedabad	779.8 mm	563 mm
Bhavnagar	620	436
Bhuj	340.4	150
Bulsar	1805.7	1242
Dhandhuka	606	400
Dhrangadhra	507.3	283
Jamnagar	466.3	255
Rajkot	594.3	450
Veraval	524.5	266

India Meteorological Department, 1962, Monthly and Annual Norms of Rainfall and of Rainy Days based on records from 1906 to 1950. Memoirs of the *India Meteorological Department*, Vol. 31, Part 3 Delhi

By 8,500 years ago, the present-natural temperate deciduous forest had returned to a site at 3000m, on the southern edge of the Himalayas in Nepal. This forest was still in place at 5,000 years ago, and up until the beginning of anthropogenic deforestation about 2,000 years ago (Yasuda & Tabata 1988). C3/C4 balance in upland (>2,000m) peats from the Nilgri Hills in southern India record suggest herbaceous communities under conditions with about the same moisture levels as today at 8,000 years ago, although during the next few thousand years there was a strong arid period (Sukumar et al. 1993).

What is 'Younger Dryas'?

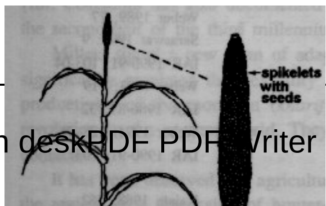
"From analysis of these sediments, we now know that since the last ice age (21000 years ago), the climate has experienced at least one major climatic reversal to cold conditions, called the "Younger Dryas" for an arctic-alpine plant "Dryas" which populated Europe during the cold conditions. The flip to cold conditions is clearly seen in records throughout Greenlands and in Europe, and it occurred suddenly, within a decade."

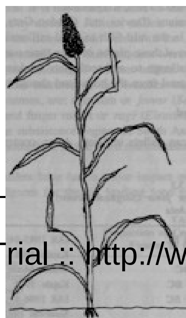
http://www.giss.nasa.gov/research/intro/peteet.01/ (NASA Goddard Institute for Space Studies: Popular Science)

The Younger Dryas was an abrupt return to near glacial conditions (~7íC lower temperatures, decreased accumulation rate, decreased methane, increased atmospheric dust), that lasted approximately 1300 years, and punctuated the transition from glacial to interglacial climates. http://www.gisp2.sr.unh.edu/GISP2/DATA/fancy.html

Pastoralism and Farming

If the last glacial maximum was recorded 18000 C 14 years BP, it would be impossible to hypothesise human, pastoral community settlements in most of Europe and most of northern Asian continent. The regions of Bharat, South-east asia were, however, had grasslands which could have supported human and cattle habitation continuously since 18000 years BP to the present day. In this glacial, environmental perspective, the spread of Indo-European languages can be related to the periods after the plough got a metallic plough-share, the hart metal tools such as axes and knives were made of copper-arsenic, copper-tin alloys and





farming became possible, after slash-and-burn preparation of land in some areas. Organized farming was possible, in the Gangetic alluvial plains and the rest of Bharat, only after the bronze age, after the hard tools of metal (bronze in the North and iron in the East and South) became widely available, ushering in a true agrarian revolution all over Bha_rat. The expansion of Sanskrit (and Vedic) can thus be postulated from the Siwalik foothills across the passes of the Western Himalayas. Such a hypothesis can also explain the significant occurrence of Dravidian and Munda (Astro-asiatic) language words in the R.gveda and the continuance of the metal crafts and arts tradition in Bharat, led by the Asurs, who migrated to the Ganga-Yamuna doab after the desiccation of the River Sarasvati between ca. 1900 to 1500 BC. This hypothesis may also explain the presence of a substrate language in Sumer (Mesopotamian civilization, of ca. 4th millennium) which contained words like san:ga (priest) and tibira (merchant), paralled in sanghvi_ (priest, Gujarati_) and tam(br)a (copper (merchant), Santali). The hypothesis may also explain the presence of a 'Language X' in Bharat, with many 'farming' terminologies not attested in IE languages.

Head of jowar, paddy; jowar (sorghum bicolor) and bajra (pennisetum tyuphoides); mature plants ca. 2 metres in height (After Reddy, S.N., 1994, *Plant usage and subsistence modeling: an ethnoarchaeological approach to the late Harappan of Northwest India*. PhD Dissertation, Dept. of Anthropology, Univ. of Wisconsin, Figs. 5-4 and 4-6).

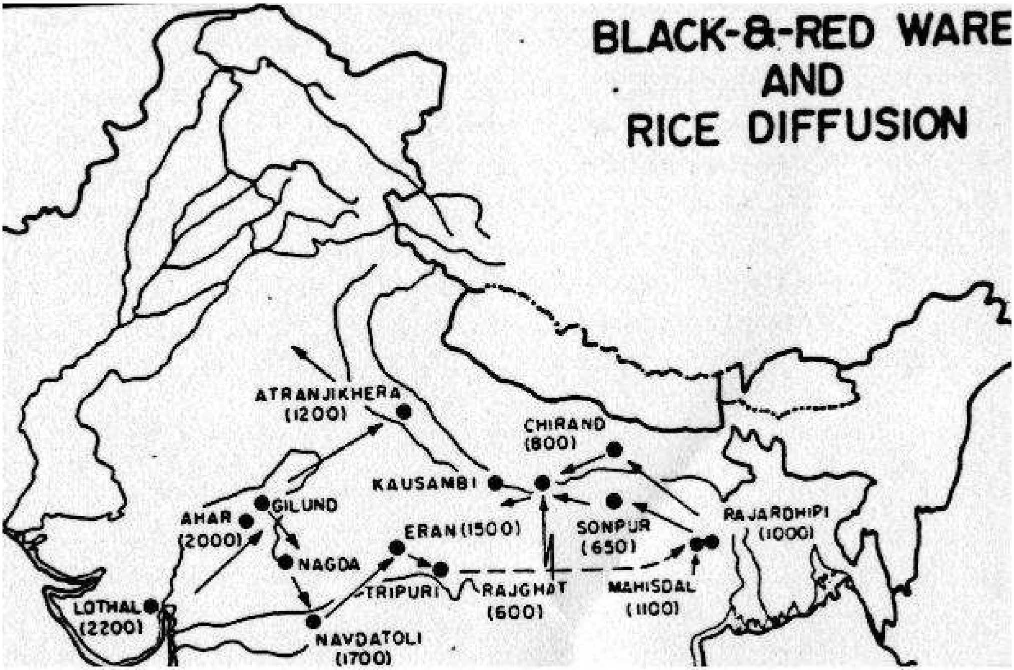
"The earliest evidence of settled agriculture in South Asia comes from aceramic and later Neolithic levels at Mehrgarh (ca. 6000 BC) where impression in mud-brick of six-



row barley, einkorn, emmer, and drum-bread wheat were identified by Costantini. In the chalcolithic period (ca. 4500 BC), barley continued to be used but was accompanied by a dramatic increase in wheat utilization...early (Neolithic) barley/wheat subsistence base established by the mid-sixth millennium BC that came to be supplemented in the early 2nd millennium by use of other cultigens such as rice, millets and sorghum...Evidence of increased dependence on agricultural foodstuffs is abundant from the Indus Civilization sites of Harappa, Kalibangan, and

Mohenjodaro. (Allchin, B. and Allchin, F.R., 1982, *The rise of civilization in India and Pakistan*, London). Archaeological evidence indicates that two varieties of wheat, barley, field peas, sesame, and mustard were cultivated at these sites, while ploughed fields during pre-Harappan times at Kalibangan (Thapar , B.K., 1973, New traits of the Indus civilization: an appraisal, in: N. Hammond, ed., South Asian Archaeology, London: 85-104; Thapar, B.K., 1975, Kalibangan: A Harappan metropolis beyond the Indus Valley, *Expedition*, 17,2: 19-32) suggest considerable antiquity for the contemporary practice of ploughing furrows at right angles to one another in order to accommodate two crops simultaneously." (Hemphill, Brian E., John R. Lukacs and K.A.R. Kennedy, Biological adaptation and affinities of bronze age Harappans, 1991, in: Meadow, R.H., ed., *Harappa Excavations: 1986-90*. Madison: 137-182). Vishnumitre and Savithri note that wheat and barley were cultivated at Mohenjodaro, Chanhudaro and Harappa; barley at Kalibangan; and rice and millet at Rangpur and Surkotada, reflecting regional variations in the cultivation of cereal crops. (Vishnu-Mittre and R. Savithri, 1982, Food economy of the Harappans, in: G.L.Possehl, ed., *Harappan Civilization: A contemporary Perspective*, New Delhi: 205-221).

Black on red ware, Khiplewala, Bahawalpur province; Mughal, M.R., 1997, *Ancient Cholistan*, Pl.58



Map showing the probably diffusion of the black-and-red ware techniques and **rice cultivation**, based on C-14 dates (given in brackets). The pattern of diffusion of black and red-ware of chalcolithic culture and of diffusion of rice cultivation indicates a movement of rice culture from Lothal (2200 BC) to Atranjikera (in the Ganga-Yamuna doab 1200 BC) and Rajadhipi (Bengal 1000 BC). The earliest appearance of the Black and Red ware is in Lothal (2200 BC) and next comes Ahar (2000 BC). The settlement evidence of this chalcolithic culture and the continuity of the vedic traditions in all parts of India indicate an indigenous development of the civilization from ca. 3000 BC to 650 BC (Sonpur).

The early occurrence of rice (oryza sativa) in domesticated variety comes from Pirak (ca. 1800 BC): "Rice is the only alimentary plant that is present in all four sectors where soil samples were taken containing burnt grains, impressions and

fragments of unburnt husks. In Sector 3 G(14) a considerable layer of archaeological deposit was revealed that was absolutely full of rice impressions. It is very compact soil consisting of small clayey layers alternating with thin, tightly packed layers of rice straw (Costantini, L., 1979, Plant remains from Pirak. In, Jean-Francois Jarrige and Marielle Santoni, *Fouilles de Pirak*. 2 vols. Paris: Publications de la Commission des Fouilles Archaeologique, Fouilles du Pakistan, No. 2:326-333). Earlier occurrences of rice are suspected to be of the wild variety: occurrence at Lothal reported dated ca. 2350-2200 BC (Ramesh Rao, K., and Krishna Lal, 1985, Plant remains from Lothal. In, S.R. Rao, *Lothal: A Harappan port town, 1955-62,* Vol.2: 679, 682-3) and at Rangpur dated ca. 2500-2200 BC (Ghosh, S.S. and Krishna Lal, 1963, Plant remains from Rangpur. In, S.R. Rao, Excavations at Rangpur and other explorations in Gujarat. *Ancient India,* 18-19:161-75).

The early occurrences of jowar (sorghum bicolor) are as follows:

Rohira (3200-2500 BC) (IAR 1983-84: 177)
Ahar Ic (2000-1500 BC) (Vishnu-Mittre, 1969, Remains of rice and millet. In, H.D. Sankalia, S.B. Deo and Z.D. Ansari, Excavations at Ahar (Timbavati). Poona: Deccan College Post-graduate and Research Institutute: 229-236)
Hulas I (2000-1700 BC) (IAR 1986-87: 132)
Senuwar (Neolithic, ca. 2000-1200 BC) (IAR 1990-91: 103)
Pirak I (1900-1600 BC bronze age) (Costantini, 1979)

The early occurrences of bajra (pennisetum typhoides) are as follows:

Babar Kot (2500-2000 BC) (Reddy, 1994: 269)
Ahar Ic (2000-1500 BC) (Vishnu-Mittre, 1969)

The early occurrences of ragi (eleusine coracana) are as follows:

Babar Kot (2500-2000 BC) (Reddy, 1994: 269).
Rojdi A (2500-2000 BC) (Weber 1991: 104).
Hulas I (2000-1700 BC) (IAR 1986-87: 132).
Daimabad (1400-1100 BC) (Kajale, M.D., 1988, Plant economy. In, M.K. Dhavalikar, H.D. Sankalia and Z.D. Ansari, *Excavations at Inamgaon*, Vol. I, Part ii. Pune: Deccan College Post-Graduate and Research Institute:727-822)

Analysing these findings, Possehl notes: "The occurrence of these millets is neither sporadic, nor thin. They occur at no less than 16 archaeological sites, in Pakistan, and Northern, Middle and Southern India. At some places they are abundant, represented by thousands of individual seeds, as with ragi in Rojdi A (Weber, S.A., 1991, *Plants and Harappan subsistence: an example of stability and change from Rojdi*. Delhi: Oxford and IBH and the American Institute of Indian Studies: 151). The archaeological documentation of these plants in South Asia, during prehistoric times, at least as earlyas the mid-third millennium BC, is strong and flourishing…Millets signal a new form of adaptation in the subsistence regime of the Indus Age. They significantly escalated the flexibility and adaptability of the Indus peoples, by increasing the productivity of the monsoon (kharif) growing season, and introduced the double cropping revolution to the ancient world. They may also inform us about long distance, inter-regional contacts." [Possehl, G.L., 1999, Tables 3.3 to 3.5, pp. 241-245; cf. Kajale, M.D., Current status of Indian palaeoethnobotany: introduced and indigenous food plants with a discussion of the historical and evolutionary development of Indian agriculture and agricultural systems in genera,. In, J.M. Renfrew, ed., *New Light on Early Farming*. Edinburgh: Edinburgh University Press: 155-89].

There are also indications, from the evidence of about 2,500 archaeological sites located on river banks (Sindhu and Sarasvati), that the Himalayan rivers were in full flow, for nearly two millennia, since ca. 3500 B.C. (and perhaps, earlier than this date). River migrations in NW India and the secular sequence of desiccation of Sarasvati River led to migrations of people, starting between ca. 1900 to 1500 B.C.,

from the Sarasvati River Basin towards the Ganga-Yamuna doab and south/east of the Gulf of Khambat towards Godavari river and beyond in South India.

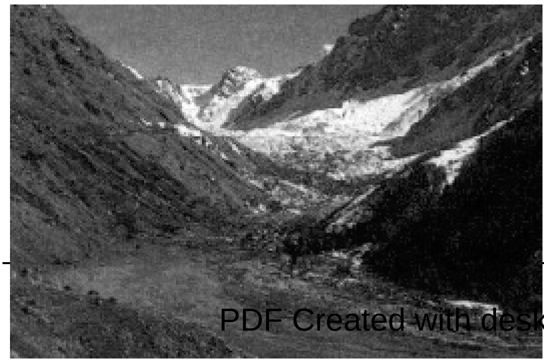
River Indo-brahm, River Sarasvati of quaternary periods

Citing the geologists, Pilgrim and Pascoe who call the Sarasvati_ the Siwalik River and Indo-Brahm River, respectively, Divaprasad Das Gupta notes that the Indo-Brahm river stretched at a time from Assm to the west of Punjab and fell into a gulf of the Arabian Sea which had its shores on the boundaries of the Punjab. Geological evidences such as boulder deposits, a particular kind of fossil deposits alongside the foot of the Himalayas point to the existence of a very large river with big tributaries. Ganga, Yamuna, Gan.d.aka of today are the outgrowth of these tributaries. Extending this earthscience perspective, Das Gupta identifies the Indo-Brahm river with the ancient Sarasvati_ and notes that the ancient centers of civilization and places of historical importance, Harappa and Mohenjodaro were situated by the Sarasvati_ river. The trace of the Indo-Brahm river is lost as the ancient wide ditch occupied by it has been filled and raised up by the rise of the Himalayas. (Divaprasad Das Gupta, Identification of the Ancient Sarasvati River, *Proceedings and Transactions of AIOC*, 18th Session, Annamalainagar, 1958, p. 535-6).

Pascoe reconstructed a hypothetical river which he named “Indro-brahm”. Pilgrim observed that the Siwalik conglomerates become more and more massive towards the northwest but disappear suddenly to the west of Jammu at the mountain exit of the Chenab river; from this observation, he concluded that a big river must have flowed parallel to the Himalayas as in the southeast-northwest direction in the Tertiary period and right upto the Pleistocene; the river must have then turned towards the Indus. Another surmise is that one of the tributaries of Ganges must have finally cut across the watershed at the back (or backwards) and must have diverted the old “Siwalik river” to the Bay of Bengal. The reorientation of the river network is noticeable from the fact that several Himalayan tributaries of the Ganges have upper courses flowing in th old westward and northwestward direction and

then turn sharply further below to the south and southeast. The view of both Pascoe and Pilgrim is that, in the Eocene period, the Brahmaputra was the source river of the Indrobrahm that flowed between the rising Himalaya and the old Gondwanaland, towards the northwest, the river flowed into a bay of the Arabian sea which occupied, during the period, the major part of the Indus lowland. In the Tertiary period, the Indus river was only the short lower course of this Indobrahm flowing in the direction opposite to the present discharge direction of Brahmaputra and Ganges. The Siwalik ranges were built up by the rubble masses of this river; the ranges arose only in the Pleistocene period. This young tectonics in the foothill zone of the Himalayas has led to convulsive changes in the hydrographic network. The river bed migrations continued right upto the recent past. (Pascoe, E.H., 1920, The Early History of the Indus, Brahmaputra and Ganges, *Quarterly Journal of Geological Society*, LXXV, 1919, pp. 138-157, London; Pilgrim, G.E., 1919, Suggestions concerning the history of the drainage of Northern India, arising out of a study of the Siwalik Boulder conglomerate, Journal and Proceedings of Royal Asiatic Society of Bengal, N.S>, v. XV, pp. 81-99). Vats notes that the site of Harappa is located six miles south of the present course of the Ravi river and the migration of the river Ravi might have been the cause for the destruction of Harappa. "There was nothing to sustain a flourishing city like Harappa after the river had shifted far away, for it must be remembered that the Dha_ya_ plateau on which the ancient ruins stand was entirely uncultivated before the construction of the Lower Ba_ri Doab Canal which now bisects." (Vats, M.S., 1940, p.7).

Glaciological and geological source of River Sarasvati in the Himalayas

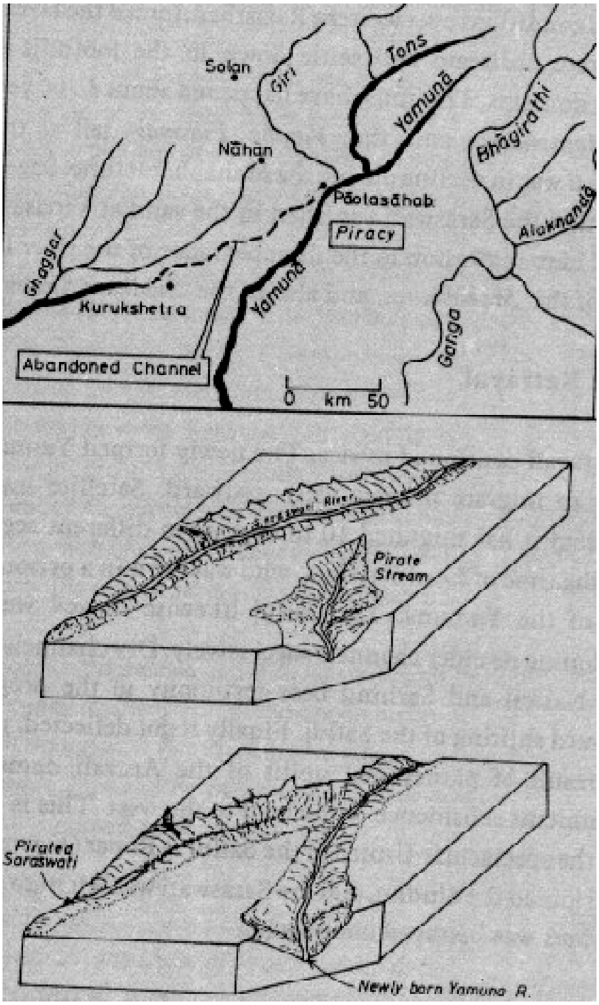


Against this backdrop of glacial age, the geological source of River Sarasvati is traced to the Himalayan glaciers by Dr. Puri who is a glaciologist with Geological Survey of India, who has, over 30 years, inventoried 1500 glaciers

in the Himalayas as part of the World Glacier Inventory, Geneva.

Tons (Tamasa) river, main confluent of Sarasvati River; springs from Har-ki-Dun glacier, Bandarpunch Massif, W. Garhwal; today it is called the Tons branch of the Yamuna.

'Drainage analysis, basin identification, glaciological and terrace studies suggest that Vedic Sarasvati originated form a group of glaciers in Tons fifth order basin at Naitwar (Netwar) in Garhwal Himalaya. In early stages, it occupied the present day drainage of Tons river upto Paonta Doon and took a westerly swing after receiving nourishment from Aglar, Yamuna and Giri. West of Paonta, it followed a westerly and southwesterly course along Bata valley and entered plains at Adh Badri. It continued to follow almost southwesterly course and traversed through Haryana, Rajasthan and Gujarat for nearly 1000 km and joined the Arabian Sea. Mighty Sutlej of today was then a tributary of Vedic Sarasvati. It is quite likely that Vedic Sarasvati might have come into existence during Upper Pleistocene period. The most important event that contributed to the desiccation of Vedic Sarasvati was reactivation of Yamuna tear fault across Siwalik belt between Kalesar and Paonta sometimes around 2450 BC (related to the earthquake evidenced in an archaeological site on the banks of the Sarasvati River: Kalibangan). As a result of this phenomenon, river Dris.advati_ came into existence which joined Vedic Sarasvati near Suratgarh in Rajasthan. With emergence of Bata-Markanda divide, complete reversal in the flowof Vedic Sarasvati occurred in Bata valley whereby it abandoned its previous course through Adh Badri-Markanda and occupied the conduit followed by river Dris.advati_. Meanwhile the Vedic Sarasvati catchment was reduced by 94.5% and got restricted to that of present day Markand. Subsequent to river Dris.advati_ migration from southwest to southeast, Palaeo-yamuna emerged that joined the Chambal river. Later, the Shatudri (Sutlej) also started shifting its course westerwards and consequently got completely detached from Vedic Sarasvati.

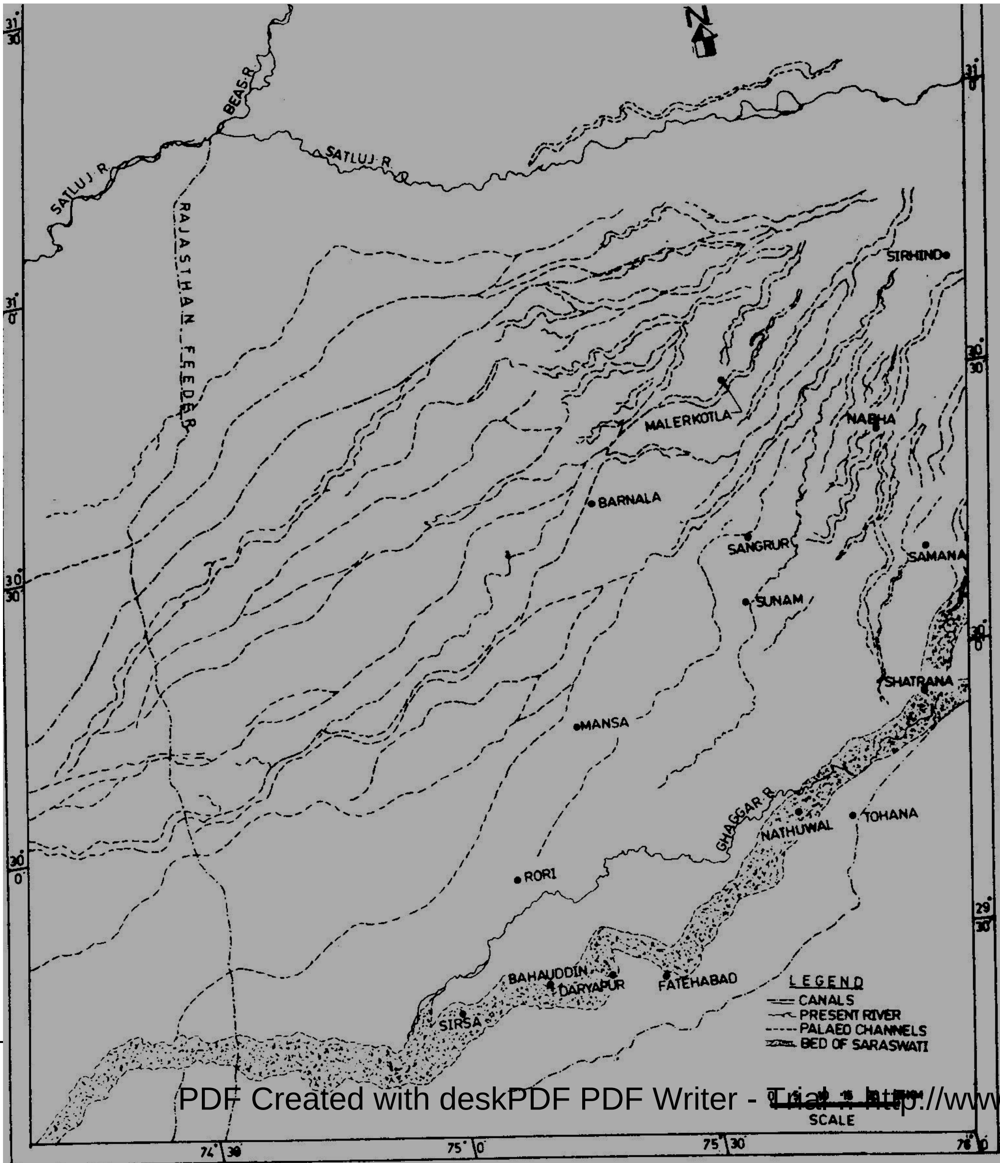


'As a result of the above-mentioned events, Vedic Sarasvti got completely deprived of its perennial source of nourishment from Himalaya. It now depends upon monsoon precipitation for its survival. With advent of drought conditions caused by either the emergence of a dry phase in climate or failure of monsoons for a number of years rather decades, Vedic Sarasvati got completely disoriented and acquired the status of present day oblivion.' (pp. 19-20)

A south-flowing branch of the Chambal, (the southwestern tributary of Ganga) cut its channel headwards and captured the water of the then south-west flowing Sarasvati. The new channel, through which the diverted watger flowed, was later named Yamuna. Map shows the drainage pattern after this river piracy—after the Sarasvati was robbed of its watger by the Ganga through the agency of its tgributary. (After Valdiya, K.S., 1996, River Piracy: Sarasvati that Disappeared, in: *Resonance*, Vol. 1, No. 5, May, Bangalore, Indian Academy of Sciences, Fig. 8).

Puri, VKM, and BC Verma, Glaciological and Geological Source of Vedic Sarasvati in the Himalayas, New Delhi, ***Itihas Darpan***, Vol. IV, No.2, 1998 (April); repr. Paper presented in Delhi on 5 October 1997, Itihaasa Sankalana Samiti:
: .
"The 'Jumna of Delhi', that is, the present day Jumna, has taken over the upper course of the old Jumna (or Proto-Jumna)…The Sanskrit word 'Jumna' means 'one of the twins'. This probably indicates that the proto-Jumna-Hakra course did not dry up immediately when the Delhi Jumna took over the upper course, there was probably a bifurcation/forking in the river and one part probably flowed for some time into the Arabian sea while the other part joined the Ganges and flowed into the Bay of Bengal. The new Jumna is 10 m deeper/lower than the old Jumna. (Ferguson, 1863, On recent changes in the delta of the Ganges, *Quarterly Journal of Geological Society,* v. XIX, London, p. 348). It is, therefore understandable that finally all the water of the Jumna flowed into the new bed and that the old Hakra course dried up." (Wilhelmy, 1969, opcit., p. 108).

Braided palae-channels of the Sutlej lying between the present Sutlej and the old Sarasvati bed. The present Ghaggar can also ben seen in the map (After Yashpal et al, 1980). The braided palaeo-channels constitute the signatures of the Sutlej river



as it migrated westward to join the Sindhu, abandoning the Sarasvati River. The ancient bed of the Ghaggar has an average width of about 6 to 8 kms. from Shatrana to Marot .

Archaeological evidence of the settlement sites on the banks of the Sarasvati River indicates the possibility of migrations away from the banks of the river between ca. 1900 to 1500 B.C. (i.e. 3,900 to 3,500 B.P.) and seems to correlate with environmental changes analysed using lithological data and water levels in different strata in the Lunkaransar and Didwana lakes. The desiccation of the Sarasvati River and the changes in climatic conditions were perhaps the principal causes for the abandonment of the ancient settlements of the civilization which had been nourished by the glacial waters of Sarasvati River and the freshwaters of the lakes between ca. 3500 and 1000 B.C. (i.e. 5,500 to 3,000 B.P.)

Synoptic Overview of Quaternary Tectonism, Climatic variations and Effects on drainage changes in NW India

Tectonic changes:

1st major tectonic activity around 10,000 BP
Nawabandar-Babarkot southern coast of Saurashtra (Holocene, Before 4500 BP) (cf. Pant and Juyal, 1993)
Kalibangan 3700 BP (cf. B.B. Lal, 1984)
Dwaraka Submergence 3600 BP (cf. S.R. Rao, 1995)
3000-5000 BP Rise of Delhi-Haridwar Ridge. Reactivation of older lineaments and vertical movements along E-W and N-S fractures. Uplift of the Aravallis.
Tectonic activity around 11th/13th Century reactivation of E-W and N-S fractures over the northwestern plains.
56 B.C. Ujjain and 60 towns (cf. Baird-Smith, 1843).
1705 A.D. Bhavnagar (cf. Manuk, 1908).
1819 A.D. Allah-Band (cf. T. Oldham, 1883)

"...intermittent reactivation of the Kutchfault and the Luni-Sukri lineament (extending from the Great Rann of Kutchto Dehradun) causing severe earthquakes such as those of 1819 and 1937 AD of Kutchwhich raised land by 5-7m at several places forming e.g. the Allah Band dam... Shift in river courses must have been aided by differenial rise of land by reactivation of Cambay graben, Jaisalmer-Barwani lineament and Khatu lineaments which trend NW-SE... The Indus has migrated towards he northwest in the northern part and towards the wes in central and southern parts. Snelgrove (1979) shows this shift in lower reaches to be as much as 160 km westward in Sind. The eastern boundary of the Indus flood plains in SInd is along the Hakra-Eas Nara. If the Sarasvati was flowing into the Hakra-Nara bed the westward shift to the Indus might have also led to the disorganisation of the Sarasvati system and its final burial in Anupgarh plains. The Indus has migrated west by 100-120 km in Anupgarh sector. " (Ramasamy et al., 1991; B.Sahai, 1999).

Effects on Drainage:

Disruption of the early drainage by choking of their valleys and formation of inland lakes like Sambhar

At 3700 BP, fluvial activity dwindles, Sarasvati course is disrupted as is that of Drishadvati. Shatadru continues to flow after its capture of Vipas; abandoning the old Beas channel. Yamuna swings away to the east beheading any connction with its west flowing course.

Luni originates from its present source. The vertical movements along N-S and E-W fractures result in the formation of the new channel of Luni; following and E-W fracture till Balotra and then flowing along a N-S fracture forming its present lower course till it meets the Great Rann.

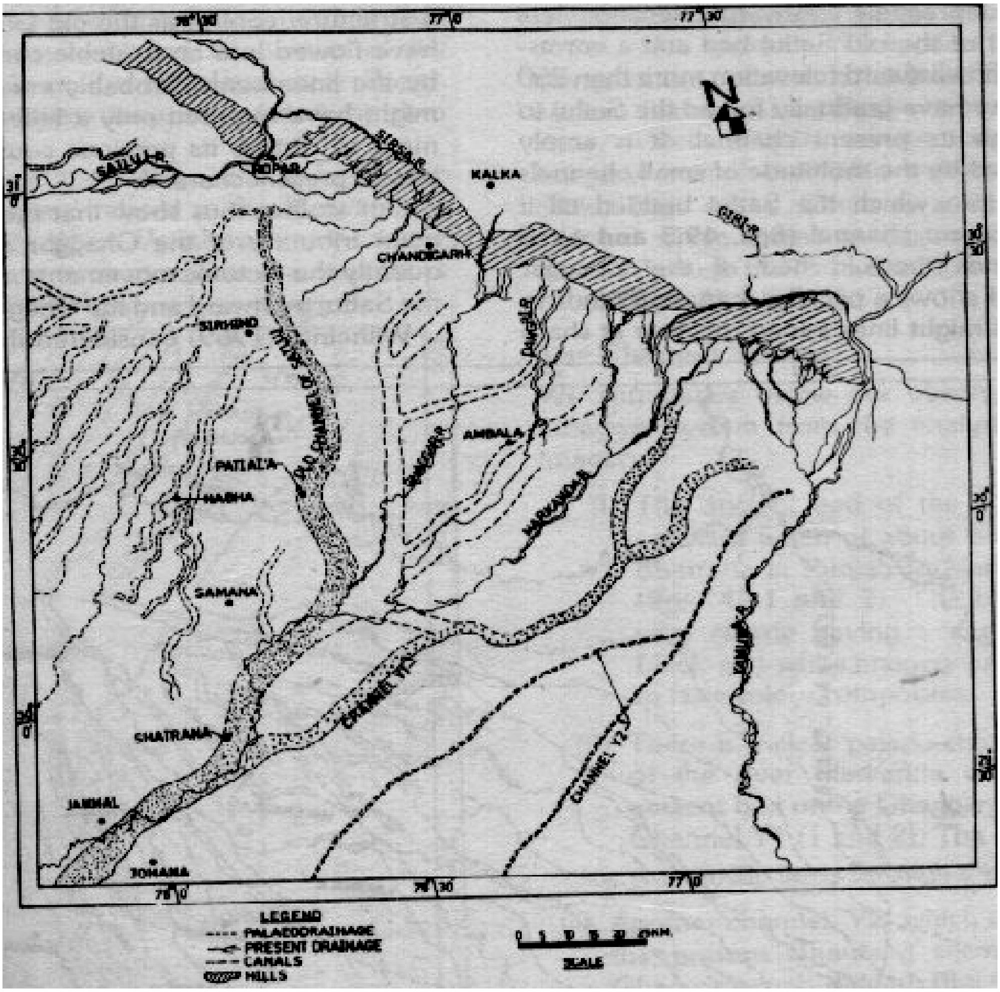
5000-7000 BP Sarasvati, Drishadvati, Shatadru and Sindhu flowed with full vigour, carried much water and formed an extensive drainage network.

Sutlej leaves its old course and joins the Indus. Ravi is captured by Chenab

Climate:

7000-10,000 BP Increase in rainfall at 8000 BP. Advent of wet phase. Freshwater conditions begin at 9500 BP. Lakes start filling up.
Wet phase continues till 4000 BP
Onset of aridity. Lakes start drying up and salinity increases at 3700

Sources:
Allchin et al 1978; Bryson and Swain 1981; Kaale and Deotare, 1997; Singh et al 1972, 1974; Swain et al. 1983; Sharma and Chauhan, 1991; Wasson et al. 1983; Ahmad, 1986; Kar, 1988; Pandya, 1967; Sridhar et al. 1997b, 1999.

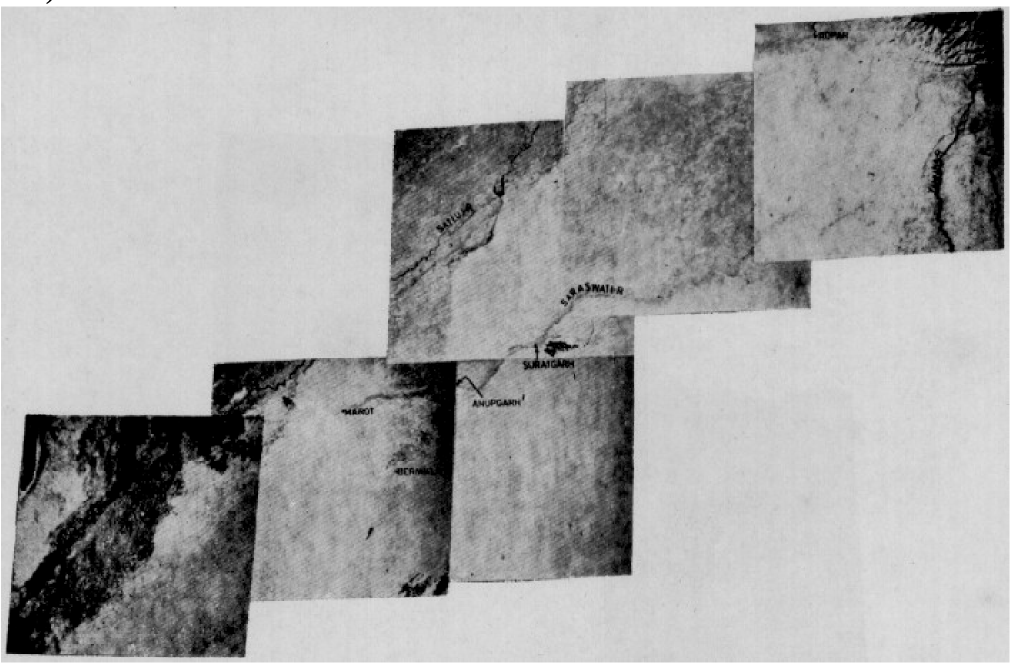


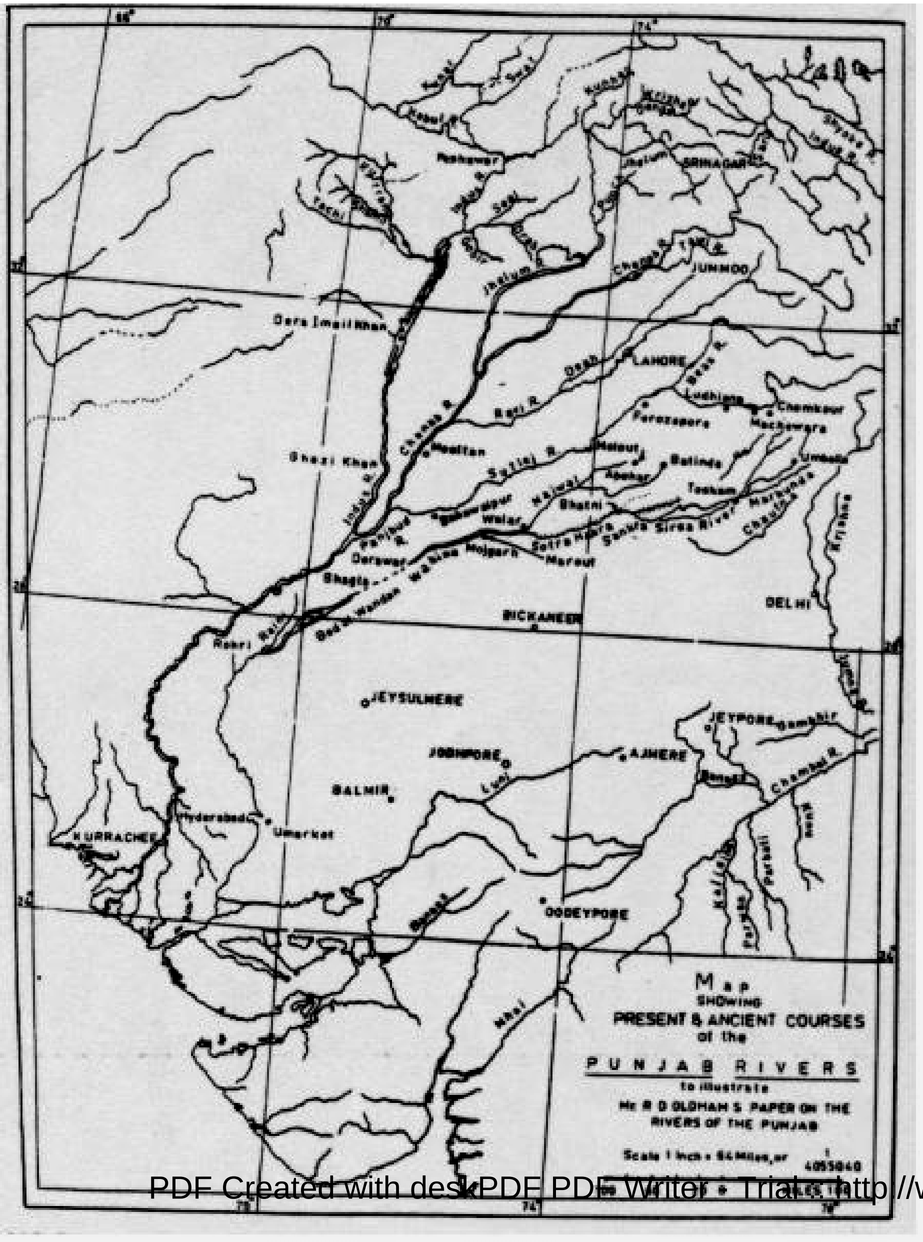
A

detailed delineation of the present river and the palaeo-channels of the Sutlej and the Yamuna joining the old bed of the Sarasvati (After Yashpal et al, 1980).

The two scientific articles (Text boxes) demonstrate the conditions for water-supply in the lakes of the Thar desert: Didwana, Sambhar and Lunkaransar, in particular. The freshwater in the lakes were at high levels ca. 10,000 to 6,000 B.P. The desiccation of the lakes occurred ca. 4,800 to 4,000 B.P. It is hypothesised that these water-level changes are attributable to the changes in the southwestern Indian monsoon rains.

Synoptic view provided by the LANDSAT of northwestern India and palaeochannels of Sarasvati River in relation the present rivers. The present Sutlej is shown taking a sharp westward turn near Rupar. Shows 6-8 km. wide palaeo-channel of Sarasvati River (from Siwalik thru Kalibangan and Anupgarh to Marot); present Shatadru (Sutlej) takes a sharp turn at Rupar. (Yashpal et al., 1984, Fig. 215).




Map
SHOWING
PRESENT & ANCIENT COURSES
of the
PUNJAB RIVERS
to illustrate
RIVERS OF THE PUNJAB
Scale 1 Inch = 64 Miles, or
SRINAGAR
JUMMOO
LAHORE
Dera Ismail Khan
Ghazi Khan
Mooltan
Ferozepore
Ludhiana
Chamkour
Machewara
Umballa
Bhatni
DELHI
BICKANEER
Rohri
JEYSULMERE
JEYPORE
JODHPORE
AJMERE
BALMIR
Hyderabad
Umerkot
KURRACHEE
OODEYPORE
Peshawar
Chambal R.
Sutlej R.

Present and ancient courses of the Punjab rivers (After R.D. Oldham, 1887, On probable changes in the geography of the Punjab and its rivers. An historico-geographical study. *Journal of the Asiatic Society of Bengal*, 55: 322-343).

Why does Hakra river bed widen below Walar: Oldham's map of Sarasvati River?

"The variation in the number and location of sites of different protohistoric cultures suggests that different segments of the river were receiving different volumes of water during different periods. For example, during the Hakra Ware and Mature Harappan times, the middle reaches of the river, between longitudes 71 deg. and 72 deg. east were receiving more water, whereas during Early Harappan times the upper reaches, comprising the area on either side of the Indo-Pakistani border and the northern part of Haryana, were receiving a higher water supply. Again, during Late Harappan times there was a decrease or cessation in the supply in western Haryana and Punjab, Ganganagar and the contiguous Bahawalpur sector though some water was available further down in western Bahawalpur. Again, the river seems to have remained completely dry for several centuries after the disintegration and disappearance of the Harappan Civilization sometime in the second millennium BC. However, it received a limited supply of water again in the first millennium BC as indicated by the presence of a few Painted Grey Ware (PGW) sites in the Ganganagar District and the contiguous Bahwalpur area (Pande 1977; Mughal 1981)... the shifting of the Sutlej and Yamuna_ courses into and away from the Ghaggar-Hakra (Sarasvati_) was neither a unique nor a simultaneous event... the Maha_bha_rata period (Sorensen, S., 1904, An Index to the names in the Mahabharata, London: 622), however, the Sarasvati_ had dried up by getting lost in the sands at Vinas'ana... However, its reappearance at several places (Sorensen 1904: 622) suggest that it was still carrying some water intermittently...Sir Aurel Stein (1942: 180) wrote that a careful study of the large-scale levelling charts prepared by the Survey of India for the Sutlej Project, when this important canal scheme was being planned by the Punjab Irrigation Department, has shown that the Hakra Branch canal passes for some 104 miles across levels between the sand

ridges of the Cholistan which unmistakably represent an ancient winding bed of the Sutlej, that once joined the Hakra between Walar and Binjor. The junction of the Hakra with a branch of the Sutlej must have meant a great increase in the volume of water, and accounts for the Hakra bed widening below the junction about Walar. This fact alone can explain the large concentration of protohistoric sites on the Hakra in the Cholistan Desert." (V.N.Misra, opcit.)

Two significant aspects of PGW culture should be noted: (1) the vast area covered; and (2) the PGW assemblage is very limited. "From Lakhiyo Pir in Sind to S'ravasti in Uttar Pradesh it is about 1,400 km., and from Gharinda in Punjab to Ujjain in Madhya Pradesh, about 900 km., a span which compares with that of the Indus Civilization...Although the culture is designated after Painted Grey Ware...this pottery constituted only 5 to 10 percent of the total ceramic assemblage." (Lal, B.B.,1992, The Painted Grey Ware culture of the Iron Age, in: Dani, A.H. and V.M. Masson, eds., *The Dawn of Civilization: Earliest Times to 700 BC*, UNESCO: 421-440). Most of the PGW pottery was in fact, red ware, some slipped but mostly unslipped. Most of the PGW sites are small on an average, ranging from 1.1 to 2.1 hectares, the largest site being Satwadi (13.7 hectares) in Bahawalpur, Pakistan. After the fall of the urban centers on the banks of the Sindhu and Sarasvati Rivers, the move was to an equally large area as the Harappan civilization but splintering off into smaller settlements compared to the size of urban settlements of the Mature Harappan period.

Ancient settlement patterns

That there are no major sites west of Ropar on the River Sutlej is a clear indication that the present-day course of the River Sutlej is a result of river migration and tectonic disturbances evidenced by the almost westward 90-degree turn of the present-day course of River Sutlej at Ropar. The satellite image analyses have established that the River Sutlej was the anchorage river of River Sarasvati, joining the latter at Shatrana where the width of the palaeo-channel (ancient course) is as wide as 20 kms. In contrast to the absence of settlements west of Ropar, there are a

number of settlements on the palaeo-channels (Naiwals) of River Sutlej as they trend North-South toward River Sarasvati.

"This dense concentration of sites on dead rivers is in sharp contrast to their scarcity or absence on the two perennial rivers of the region, namely the Sutlej and Yamuna_. Thus, for example, of the Early and Mature Harappan periods, only two sites of each are found on the Sutlej, both near Rupar where the river emerges from the Siwaliks. Of the Late Harappan period, only seven sites are found on this river, all of them in the upper reaches close to the hills. There is a complete absence of sites once the river enter the plains. Similarly, on the Yamuna_, Harappan sites of all periods are conspicuous by their total absence whereas they are present in strength in the non-riverine region to the west of the Yamuna_, and those of Mature and Late Harappan, particularly the latter, are present in large numbers on small tributary streams between the Yamuna_ and the Ganges. It will be clear from the above account that the focus of the Harappan Civilization was not on the Indus and its tributaries but on the Ghaggar-Hakra and its tributaries which flowed between the Indus and the Ganges rivers." (V.N.Misra, opcit., p. 514).

"Of the 1400 sites known in India and Pakistan (as of 1984), as many as 1097 (nearly 80%) are located on the vast plain between the Indus and the Ganges, comprising the Cholistan region in the Bahawalpur District of Punjab (Pakistan), The Ganganagar District of Rajasthan, Haryana, PUnjab and western Uttar Pradesh. They range in time from the Hakra Ware Culture of the fourth-third millennia BC to Late Harappan Culture (including its variant, Ochre Coloured Pottery (OCP) of the late second millennium BC)... Two of the largestsettlements of the Harappan Civilization -- Ganweriwala Ther in Bahawalpur and Rakhigarhi in Haryana-- are located in this region... in the Cholistan Desert the densest concentration of protohistoric sites...occurs...south of the confluence of the Chenab and Sutlej rivers, roughly between longitudes 71deg. and 72deg. east. The oldest protohistoric sites, namely those of the pre-Early Harappan Hakra Ware Culture, are confined to the Cholistan region but some of their ceramic elements are known to extend into the adjoining Ganganagar District of Rajasthan.. only 44 sites are

located in Sind on, and in the vicinity of the Indus... The total absence of Harappan sites and abundance of PGW sites on the Yamuna_ is eloquent proof that this river was not flowing in its present channel during Harappan times but had shifted to it during PGW times.

Concentration of settlements on Sarasvati River Basin

Coordinate and site-size information is useful to identify the major 'riverine ports' (pat.t.an.a) of the civilization on Sarasvati River Basin and nearby Sindhu River Basin:

Coordinates for some sites (which are about 15 ha. in extent and with finds of inscriptions) in the River Basins are presented in the section titled: **Sites in India and West Asia where inscriptions (dated ca. 5,500 to 3,500 BP) were discovered.** [This short-list is prepared based on a hypothesis that size is an index of urbanism].

1. This short-list is made out of a total of 2,600 sites of varying sizes,ranging from 0.05 ha. to 15 ha. (given in GL Possehl, 2000, *Indus Age: the beginnings*, Delhi, Oxford and IBH, pp. 727 to 845).
2.There is a remarkable clustering of relatively larger-sized site in the districts of Bhatinda and Bahawalpur.
3. Most of these sites are on the Sarasvati River Basin.
4. Out of 6 sites which measured more than 100 ha., four sites are located on the banks of the River Sarasvati: Lakhmirwala, Gurnikalan,and Hasanpur (all three in Bhatinda District, Punjab, India) and Rakhigarhi (Hissar, Haryana, India); these four sites on the SarasvatiRiver Basin and two other sites, Harappa (Sahiwal) and Mohenjo-daro (Larkana) on the left banks of River Ravi and River Sindhu (Eastern Nara Canal) -- i.e. the two sites, Harappa and Mohenjo-daro are accessible from the right bank of the River Sarasvati -- are also very close to the Sarasvati River Basin, with access to the mineral resources of Rajasthan, Gujarat, Badakhshan,Herat, Panjshir (Afghanistan), and Kirtihar/Salt Ranges:

Lakhmirwala (Bhatinda) [225 ha.]
Rakhigari (Hissar) [224 ha.]
Gurnikalan One (Bhatinda) [144 ha.]
Harappa (Sahiwal) [100 ha.]
Hasanpur (Bhatinda) [100 ha.]
Mohenjo-daro (Larkana) [100 ha.]

Thus, the three Bhatinda district sites, and sites of Rakhigari, Harappa and Mohenjo-daro can be hypothesised to constitute the commercial hubs of the bronze age civilization.

6. Other sites ranging in size between 40 ha. and 81.5 ha. are as follows:

Ganweriwala (Bahawalpur) [81.5 ha.]
Kotada (Jamnagar) [72 ha.]
Nagoor (Sukkur) [50 ha.]
Nindowari (Jhawalan) [50 ha.]
Tharo Waro Daro (Sukkur) [50 ha.]
Mangli Nichi (Ludhiana) [40 ha.]

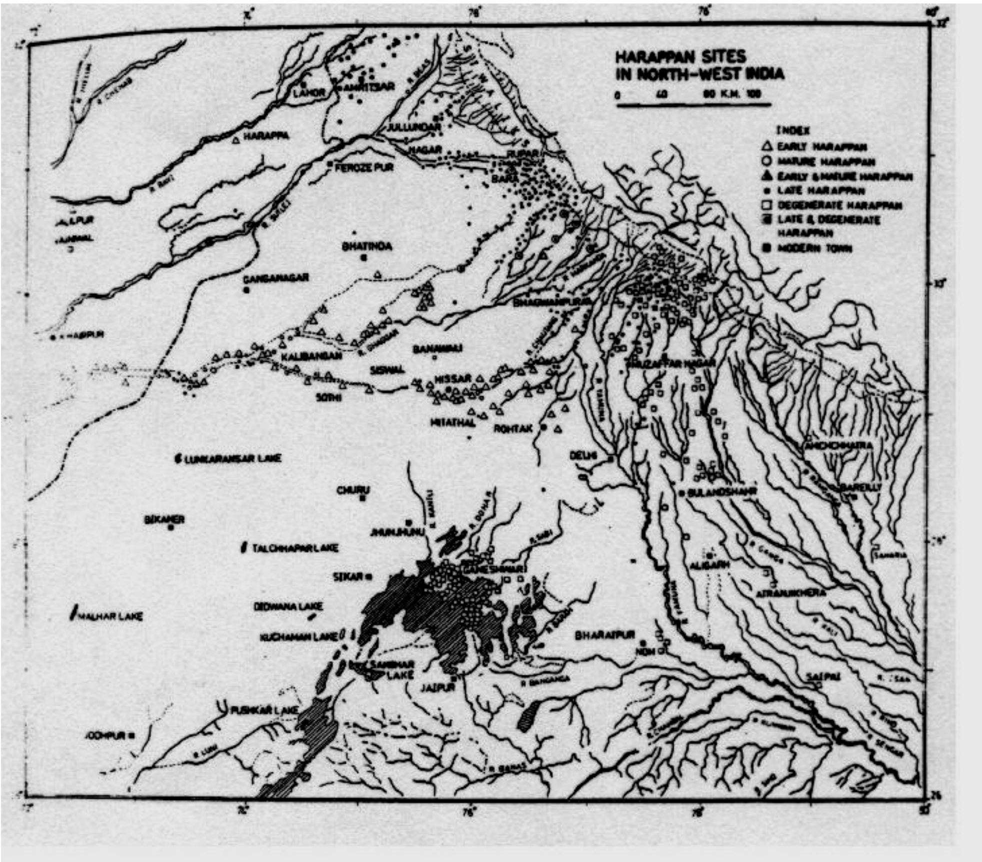
7. Other 'urbanised' sites of sizes between 23 ha. and 49 ha. are:

Baglianda Theh (Bhatinda)
Bare Two (Bhatinda)
Budhel (Bhavnagar)
Butewala (Bahawalpur)
Chambrawala (Bahawalpur)
Chandnewala (Bahawalpur)
Dabar Kot (Loralai)
Daimabad (Ahmednagar)
Dalliwala One (Bhatinda)
Dalliwal Two (Bhatinda)
Datrana Eight (Banaskantha)
Derawar Ther (Bahawalur)

Devalio (Surendranagar)
Develiwala (Bahawalpur)
Dhalewan (Bhatinda)
Dholavira (Kutch)
Hirke (Bhatinda)
Judeijo-daro (Kachi)
Karanpura (Bhatinda)
Kudwala The (Bahawalpur)
Lathwala (Bahawalpur)
Lunida One (Bahawalpur)
Musafarwali (Bahawalpur)
Naru Waro (Khairpur)
Sihnewali (Bhatinda)

Could the site Sinewali (Dist. Bhatinda) be relatable to Sini_vali_of the R.gveda?

Harappan sites in North-West India, lakes in Rajasthan and the ancient river courses (After V.N.Misra, 1984, Climate, a factor in the rise and fall of the Indus Civilization—Evidence from Rajasthan and Beyond, in: B.B.Lal and S.P. Gupta,



eds., *Fronters of the Indus Civilization*, Fig. 48.5; also: V.N.Misra, 1994, Indus Civilization and the Rgvedic Sarasvati_, pp. 511-525, in: *South Asian Archaeology 1993*, Helsinki).

Distribution of Harappan Sites in NW India

7 6

8 9

Note: Some sites were occupied during more than one period. 46 sites in Sikar District in the Aravalli Hills (Rajasthan) are excluded, which relate to the Ganeshwar culture, a variant of Harappan culture.

The number of sites of Early Harappan culture on the Indus river is very small: Balakot, Amri, Kot Diji and Mohenjodaro in Sind; Jalilpur, Harappa, Gumla, Sarai Khola in Punjab. Juxtaposed to this distribution, the number of sites along the dry bed of the Hakra-Ghaggar is very dence. In 1981, 41 sites were identified on the Hakra in the Cholistan desert and over 60 sites were marked on the Ghaggar and its tributaries in Punjab, Haryana and Rajasthan. Thus, the early settlements were dominantly on the Sarasvati river basin. The Ganeshwar metal cultures were also perhaps contemporary to this early Harappan phase. The total number of settlements increases significantly in the Mature Harappan cultural phase: Hakra valley, 166 sites; Gujarat, 18 sites; Indus valley, 16 sites; Haryana, 24 sites; Punjab, 34 sites. The distributio of sites of the Late Harappan phase: Hakra valley, the sites decline to 72; Gujarat, the sites increase to 95; Haryana, the sites increase to 30; Punjab, the sites increase to 85; suddenly 66 sites emerge in the Yamuna-Ganga doab while no site of the Mature Harappan phase existed in this region. There is a pronounced shift to the upper courses of the Ghaggar and Sutlej indicating a clear migratory path from the lower reaches of Sindhu to the upper reaches of the Saravati and from the middle and lower reaches of the Sarasvati and Rann of Kutch, to the hinterland of Saurashtra.

A compilation made in 1984 presents a picture comparable to the above analysis (Joshi, J.P., Madhu Bala, and Jas Ram, 1984, The Indus Civilization: a reconsideration on the basis of distribution maps in: B.B.Lal and S.P. Gupta, eds., *Fronters of the Indus Civilization*, New Delhi, Books and Books, pp. 511-539):

Distribution of sites in States along the Sarasvati River Valley

Early Harappan (ca. 2500-2200 BC)

Punjab	23
Haryana	103
Rajasthan	8
Total	**134**

Harappan (ca. 2200-1700 BC)

Punjab	32
Haryana	44
Rajasthan	24
Total	**104**

Late Harappan (ca. 1700-1000 BC)

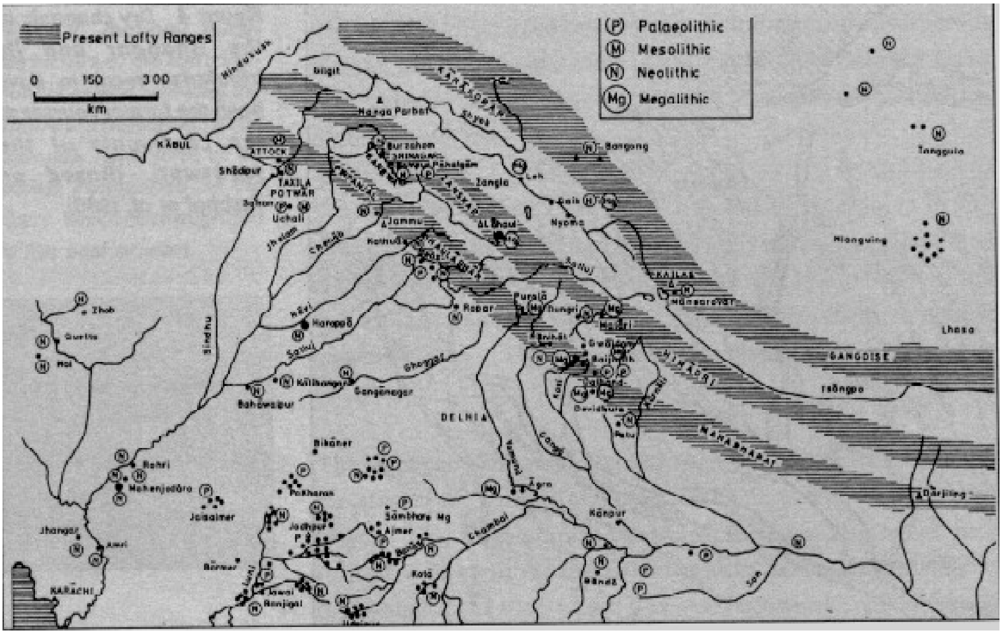
Punjab	102
Haryana	297
Total	**399**

Note: The date for Early Harappan has been pushed back to ca. 3500 BC thanks to the excavations by Kenoyer and Meadow at Harappa in February 1999. Late Harappan is a dedvolutionary stage of the Civilization with a number of regional, variations; but, common heritage is shared, for e.g., a few inscribed seals and sealinga or potsherds, faience, agate and carnelian beads and bangles, a few terracotta cakes, balls and bangles, copper-bronze objects; sites were on small rivers, monumental structures had yielded to mud-brick or mud houses in small sites of 1 to 2 hectares.

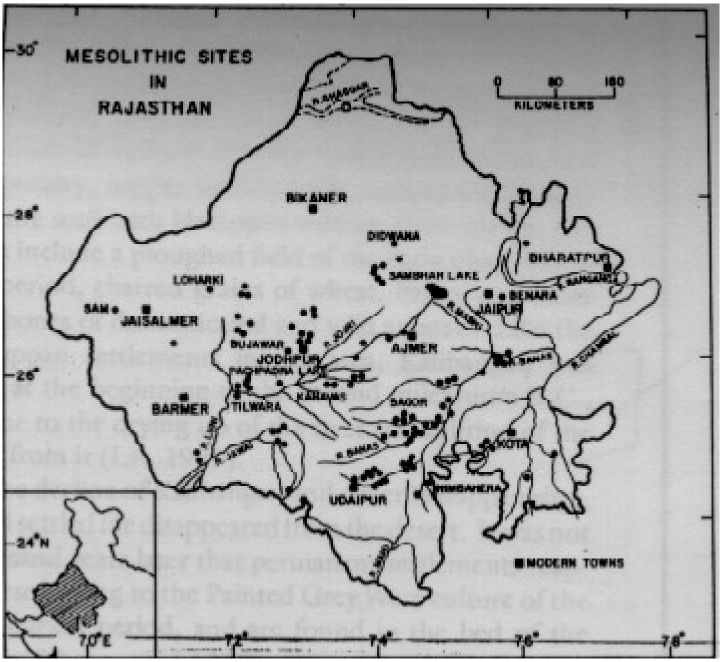
It is seen from this North-West India map that no Harappan archaeological sites are located in the arid belt of Rajasthan, near the salt-water lakes. Most of the sites are clustered around river banks. This map has been prepared taking into account the distribution of over 800 sites of various Harappan phases based on Jansen's analysis. (Jansen, M., 1980, Settlement Patterns in the Harappa Culture, in: *South Asian Archaeology*, H. Hartel ed., 251-269, Berlin: dietrich Reimer Verlag). Out of

these 800 settlements, over 530 settlements are located on the Hakra-Ghaggar (Sarasvati) system. Adding 200 Harappan sites of the Kutch-Saurashtra region and 70 late Harappan sites of the Yamuna valley in Uttar Pradesh (mainly Saharanpur district), only about 100 sites are seen located on the Indus Valley proper and in Baluchistan.

Settlements of the stone-age in the Palaeolithic to Neolithic period "Western rajasthan—including the Thar tract—was a wetter region some 40,000 years ago. Periods of dryness alternated with phases of wetness. This is testified by pollen grains buried and trapped in the sediments of the Lunkaransar and Didwana lakes and by thermoluminescence of sands in dunes and floodplains. The Sarasvati and its tributaries held sway in the northern part, and the Lavanavati (Luni) had an organized drainage netgwork of perennial streams in the southern part. It was in this well-watered, presumably fertile and congenial land of the Sarasvati, Dris.advati and Luni that the stone-age people established their settlements, and developed their Palaeolithic, Mesolithic and Microlithic cultures." (After Valdiya, K.S., 1996, River Piracy: Sarasvati that Disappeared, in: *Resonance*, Vol. 1, No. 5, May, Bangalore, Indian Academy of Sciences, pp. 21-22; Fig. 5; and V.N. Misra, 1995, Geoarchaeology of Thar Desert, Northwest India, in: S. Wadia et al, eds., *Quaternary Environments and Geoarchaeology of India*, Geological Society of India, Bangalore 210-230).


Present Lofty Ranges
0 150 300
km
Palaeolithic
Mesolithic
Neolithic
Megalithic
KĀBUL
ATTOCK
Shāhdpur
TAXILA
POTWĀR
Uchali
Gilgit
Nanga Parbat
Burzahom
Pahalgām
Zangla
Leh
Bangong
Nyoma
Jammu
Jhelam
Chenāb
Harappā
Rupar
Kalibangan
Ganganagar
Bahawalpur
Sindhu
Zhob
Quetta
Nal
Purola
Kailās
Mānasarovar
Lhasa
GANGDISE
Tsāngpo
Tanggula
HIMĀDRI
MAHABHARAT
DELHI
Bikāner
Pokharan
Jaisalmer
Jodhpur
Sāmbhar
Ajmer
Kota
Chambal
Kānpur
Bānda
Son
Dārjiling
Rohri
Mohenjodāro
Jhangar
Amri
KARĀCHI
Bārmer
Ranjigal

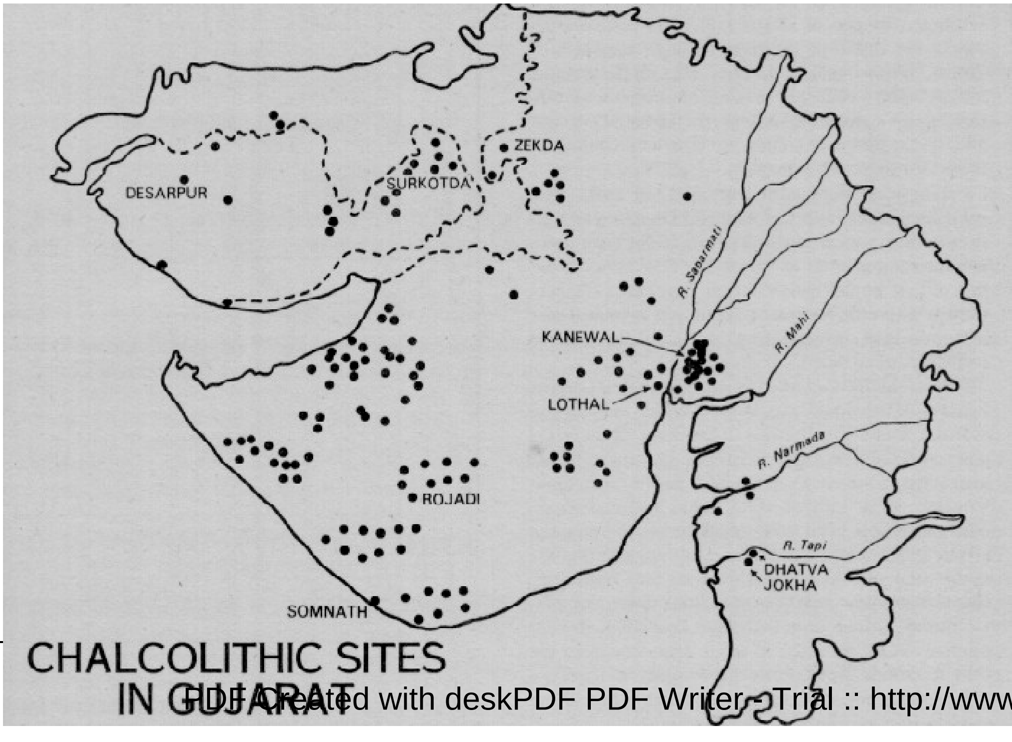
Rajasthan: Mesolithic sites. "The succeeding Mesolithic phase is represented by a



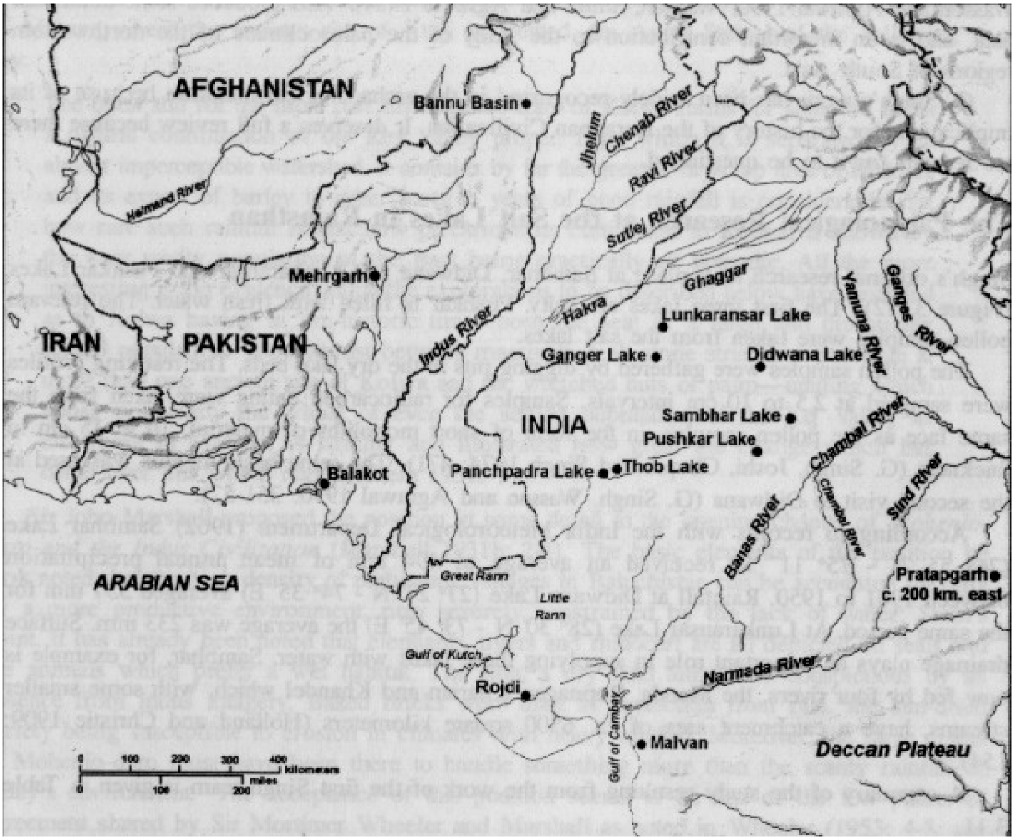
large number of sites across the desert (Misra, 1977; Allchin et al, 1978). Virtually on every dune in the region Mesolithic artifacts can be found. This proliferation seems due almost certainly to (1) amelioration of climate during late Pleistocene to mid-Holocene and consequent increase in food resources and human population; and (2)the introduction of new technological traits like the bow and arrow, mace-heads, slings, querns and rubbers which contributed to greater successes in hunting and the processing of raw foods. The size of the sites extends upto 10,000 sq. m. as at Tilwara in Barmer district in the Luni valley...Evidence from Bagor in Bhilwara district (eastern Aravallis) indicates that the Mesolithic people had also taken to stock-raising in addition to hunting and gathern...Radiocarbon dates from Bagor

take the antiquity of Mesolithic culture to –6500 BP (Misra, 1977), while TL dates from the Mesolithic artifacts bearing buried dune soils near Didwana range from 16,000 to 6,000 BP (Wasson et al, 1983)…(agriculture in the desert)…the valley of the Ghaggar-Hakra (Sarasvati of the Rigvedic period) river along the northern and western margins of the Thar which carried water till the end of the second millennium BC" (Singhvi, A.K. and Kar, Amal, eds., 1992,*Thar Desert*, pp. 89-91)

Chalcolithic sites in Gujarat; rural settlements. The clusters link up the Little Rann of Kutch, Lothal and through Rojdi to Somnath (Prabhas). The typical finds were microbeads and dishes-on-stand. (After R.N.Mehta, Some Rural Harappan Settlements in Gujarat, in: Possehl, ed., *Harappan Civilization*, 1982, p. 169). It is surmised that the ancient course of the Sarasvati_ River did link up with the Gulf of Khambat (Lothal) and also Prabhas.



There are indications of a pre-Harappan culture in Rajasthan. Bagor located on the left-bank of Kothari river and 25 km. west of Bilwara in eastern Rajasthan had a microlith industry (5000-2800 B.C.)(Sankalia, 1974, *The Pre-history and Proto-history of India and Pakistan*, Pune, Deccan College, 260-64); the chalcolithic phase at this side yielded bits of copper/bronze, one spearhead, one thin rod and three arrowheads (ca. 2800 B.C.) Jodhpura located on the right bank of river Sabi, near Jaipur and Ganeshwar, 15 km. from Neem-ka-Thana (37.40N and 75.51E)



yielded over 1000 copper objects (ca. 2500 B.C.): arrowheads, spearheads, fish-hooks, spiral-headed pins, celts, thin blades, bangles, chisels. Axes were cast in mould and edges bevelled by hot and cold forging. There is a place near Ganeshwar called Kulha_d.e-ka_-Johad. (pond of axes). Round indentations made with pointed copper drills, in combinations of 1-6 dots, totalling between 4-16 were noticed on the butt of the celts, indicating some ancient system of numeration. Similar indentations wre noted in later-day celts found at Kayatha and Navdatoli. Kantali river was close to these sites and this river linked up with the Sarasvati near Kalibangan. A copper hoard was found at Kurada (Nagaur district): 55 rings, 21 curved thin blade or choppers, 11 chisels, 9 bowls, 7 celts. (Agrawala, R.C.,1984, Aravalli, the major source of copper for the Indus and Indus-related cultures, in *Frontiers of the Indus Civilization*, eds. B.B.Lal, S.P. Gupta and Shashi Asthana, Delhi, Books and Books, pp. 157-62).

Weather studies

Based principally on palynological studies, Gurdip Singh suggested that the Rajasthan desert region should have had a more wet climate between ca. 3000 and 1800 B.C. with at least 50 cm more than the present rainfall; the first sedimentation in the lakes is noticed from ca. 8000 B.C. with estimated rainfall of at least 25 mm more than the present rainfall. (G. Singh, 1971, The Indus Valley Culture (Seen in the context of post-glacial climate and ecological studies in North-West India), *Archaeology and Physical Anthropology in Oceania*, 6(2): 177-189; Singh, G., Joshi, R.D., Chopra, S.K., and Singh, A.B., 1974, Late quaternary history of vegetation and climate of the Rajasthan Desert, India, *Philosophical Transactions of the Royal Society of London (Biological Sciences)*, 267 (889): 467-501). Palynological evidence for Singh's theory was taken from one fresh water lake: Pushkar lake (26^0 29'N, 74^0 33'E) located in a semi-humid belt (50 cm rainfall) and three salt lakes: Sambhar lake (17 N 75'E), Didwana lake (27^0 20'N, 74^0 35'E) and Lunkaransar (28^0 30'N, 73^0 45'E), located in semi-arid/arid belt (25 cm rainfall); all the lakes are in Rajasthan.

Locations of the palynological studies indicating the lakes of Rajasthan (After Possehl, G.L., 1999, Fig. 3.112) The study of Gurdip Singh et al (Singh, G., Joshi, R.D., Chopra, S.K., Singh, A.B., 1974, Late quaternary history of vegetation and climate of the Rajasthan Desert, India. *Philosophical Transactions of the Royal Society of London*, B, Biological Sciences, 267(889): 467-501) is based on palynological research at four Thar Desert Lakes. The results are summarized as follows:

8000-7500 BC	Pollen indicates fresh water lakes; moist phases with more rain than today
ca. 7500 BC	Indication of large scale use of fire by man. Probable beginning of cultivation; cerealia-type pollen
7500-3000 BC	Poor plant cover; dry phase; but not as dry as today
3000-1800 BC	Grassy steppe savanna with good tree growth; obstacle dunes, parabolic dunes developed from the sand washed away from sand shields; moist phase with ca. 500 mm more rain than today
ca. 1800-BC	Lunkaransar Lake begins to dry-up; onset of aridity
1800-1400 BC	Sambhar Lake begins to turn saline; increase in halophytes; aridity continues and spreads east
1400-1000 BC	Lakes contain freshwater; aridity ameliorates
1000 BC	Lakes begin to turn saline; beginning of present aridity
1000 AD-today	Rajasthan lakes saline; present aridity

[After Possehl, G.L., 1999, Table 3.11, p. 259].

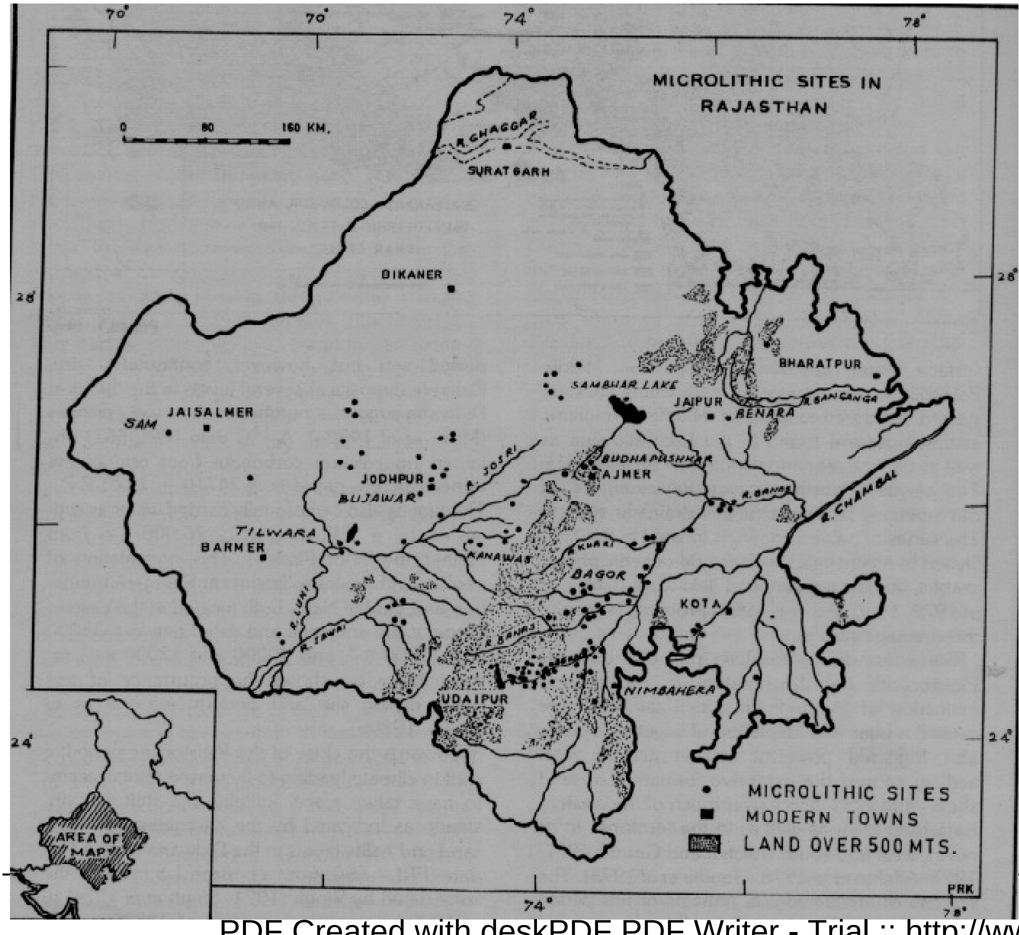
Note on present rainfall: Indian Meteorological Department: (1962, monthly and annual norms of rainfall and of rainy days based on records from 1906 to 1950. *Memoirs of the India Meteorological Department*, Vol. 31, Part 3 Delhi): Sambhar Lake: 494 mm of mean annual precipitation (1901-50); Didwana Lake: 357 mm.; Lunkaransar Lake: 233 mm. Northern tropics of Asia and Africa had increased solar radiation between 10,000 and

4,000 BC which enhanced the contract between the sea and land masses producing strong summer (southwest) monsoons. This explains the high lake levels. (Cooperative Holocene Mapping Project, 1988, Climatic changes of the last 18,000 years: observations and model simulations. *Science,* 241: 1043-52).

The Sambhar Lake is filled by surface drainage from four rivers: Menda, Rupnagar, Kharian and Khandel with a catchment area of ca. 6500 sq. kms. (Holland, T.H. and Christie, W.A.K., 1909, The origin of the salt deposits in Rajputana, *Records of the Geological Survey of India*, 5(38): 154-86:). It is possible that the salinity levels of the lakes is conditioned by subsurface drainage which is subject to changes caused by large-scale tectonic activity by the collision of the Deccan and Tibetan plates. "…it is also true that at ca. 2000 BC there is geological evidence for major changes in surface, and probably subsurface, drainage in northern Rajasthan, eastern Punjab, Haryana and western Uttar Pradesh; an event that led to the desiccation of the Sarasvati Riverine system, the rejuvenation of the Sutlej River and the creation of the Yamuna River." (Possehl, G.L., 1999, *Indus Age: The Beginnigns*, p. 263)..

Consistent with the findings of these studies, related to increased rainfall towards the close of the Pleistocene period and increased duration of increased rainfall from the beginning of the Holocene and the stabilization of the dunes, a widespread occurrence of microlith sites on the dunes is noticed. "The widespread occurrence of microliths on dunes (including in the core of arid zone) is ample proof that the climate was conducive to supporting larger human populations " (Misra, V.N., Rajaguru, S.N., Raju D.R., Raghavan, H. and Gaillard, C.1982, Acheulian Occupation and Evolving Landscape around Didwana in the Thar Desert, India, *Man and Environment*, 6: 72-86). The microlithic sites in Rajasthan are shown on the map; the site clusters are in Mewar upland on rocky terrain, dunes and alluvial flats along river banks. "The limited faunal material available from Tilwara includes both domestic and wild forms. The far richer fauns from Bagor on the

eastern side of the Aravallis is composed largely of domestic sheep and goat." (V.N.Misra, 1984, Climate, a factor in the rise and fall of the Indus Civilization—Evidence from Rajasthan and Beyond, in: B.B.Lal and S.P. Gupta, eds., *Fronters of the Indus Civilization*, p.466; loc.cit. Misra, V.N., 1973, Bagor—A late Mesolithic settlement in North-West India, *World Archaeology* 5(1): 92-110); Thomas, P.K., 1975, Role of animals in the food economy of the Mesolithic culture of western and central India, in: *Archaeological Studies*, A.T. Clason, ed., 322-328, Amsterdam, North-Holland).



Microlithic Sites in Rajasthan

Microlithic Sites in Rajasthan (After V.N.Misra, 1984, Climate, a factor in the rise and fall of the Indus Civilization—Evidence from Rajasthan and Beyond, in: B.B.Lal and S.P. Gupta, eds., *Fronters of the Indus Civilization*, Fig. 48.2).

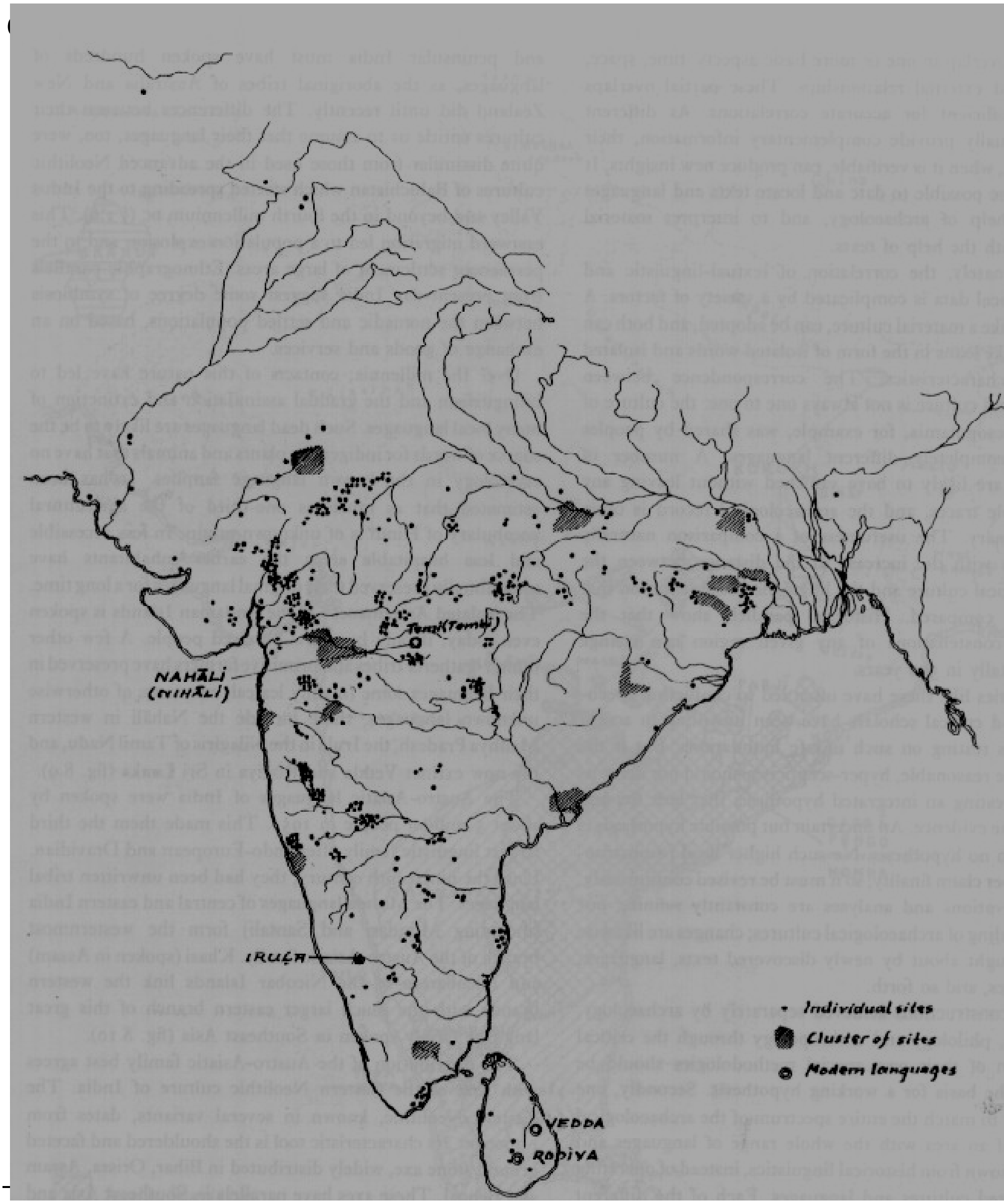
However, in eastern Rajasthan, which is a semi-humid region, "in the valleys of the Banas and its tributaries in the districts of Udaipur, Chittorgarh, Bhilwara, Ajmer and Tonk, a large number of settlements of the Ahar culture dated between 2100 BC and 1200 BC have been found. (loc.cit. V.N.Misra, 1984, Climate, a factor in the rise and fall of the Indus Civilization—Evidence from Rajasthan and Beyond, in: B.B.Lal and S.P. Gupta, eds., *Fronters of the Indus Civilization*, p. 468). Further north in Bharatpur, Jaipur and Sikar districts, a number of settlements of Ochred Coloured Pottery (OCP) and Ganeshwar cultures have been found in the valleys of the rivers Banganga, Gambhir, Dohan, Krishnavati and Kantli that rise in the northern flanks of the Aravallis and flow north-east into the Yamuna or northward into the sandy plains of Haryana. The Ganeshwar culture sites in this area, particularly those in Sikar district, are very rich in copper objects." (Agrawala, R.C., 1981, Recent explorations in Rajasthan, *Man and Environment*, 5: 59-63).

Microlithic sites in India and neighbouring regions and the areas of the substrate languages of Naha_li, Irul.a, Vedda and Rodiya (After Schwartzberg, Joseph, ed.,1978, A historical atlas of South Asia, Chicago; loc. cit., Parpola, 1994, Fig. 8.9) It is likely that many lexemes of the Pra_kr.ts were derived from the hundreds of such languages which should have constituted the substratum of the Linguistic Area in Indic protohistory.

Microlithic sites in India and neighbouring regions and the areas of the substrate languages of Naha_li, Irul.a, Vedda and Rodiya (After Schwartzberg, Joseph, ed.,1978, A historical atlas of South Asia, Chicago; loc. cit., Parpola, 1994, Fig. 8.9) It is likely that many lexemes of the Pra_kr.ts were derived from the hundreds

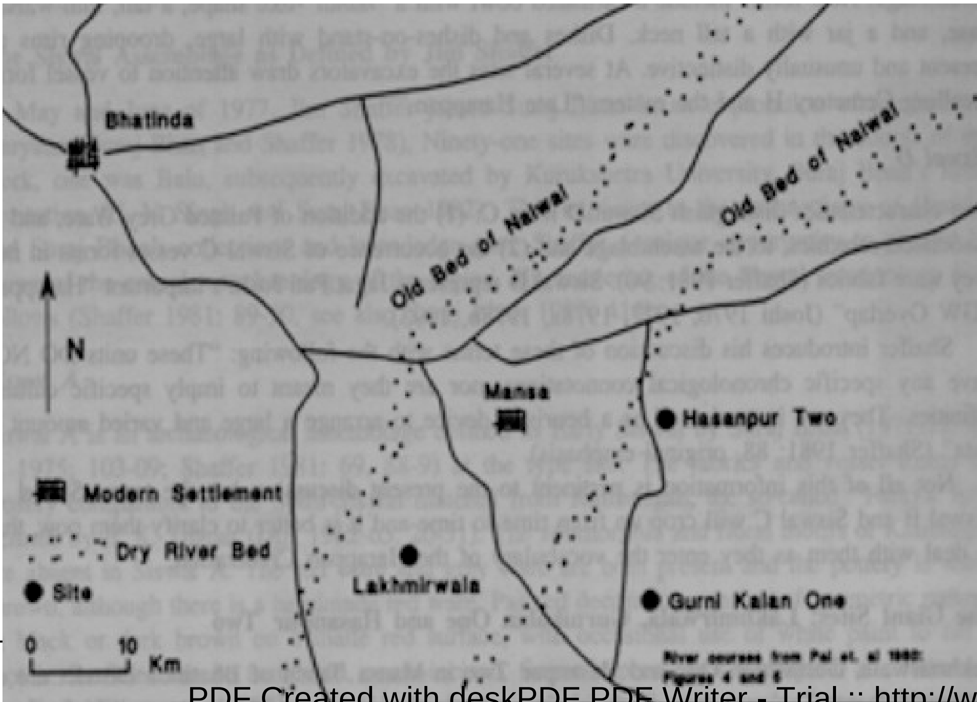
of such languages which should have constituted the substratum of the Linguistic Area in Indic protohistory.

oss of


NAHĀLI
(NIHĀLI)
Tamil (Tomil)
IRULA
VEDDA
RODIYA
Individual sites
Cluster of sites
Modern languages

vegetation and consequent migrations of people.j "The weight of modern opinion appears to be against desiccation in the true sense of an actual climatic change; but prolonged human interference with natural drainage, deforestation of the Siwaliks, and so on have undoubtedly led to marked deterioration in ground-water conditions and so in vegetation. The accounts of Alexander's campaigns and Mogul hunts bear witness to considerable forest growth; and today on the more arid margins strong winds and frequent but torrential rains have led to a serious spread of shifting sands and more serious if less spectacular deterioration of good cultivated land." (Spate, O.H.K and Learmonth, A.T.A., 1967, *India and Pakistan: A general and regional geography*. 3rd edn. London: Methuen & Co.: 519).

The extent of the civilization area (about 700,000 sq. kms.) was twice the size of ancient Egypt and Mesopotamia. With over 2,500 settlements discovered so far, about 2,000 of the ancient settlements were on the Sarasvati River Basin. Most of



these sites are small villages or hamlets (between 1 and 10 hectares) and a few were larger towns and cities (10 to 50 hectares).

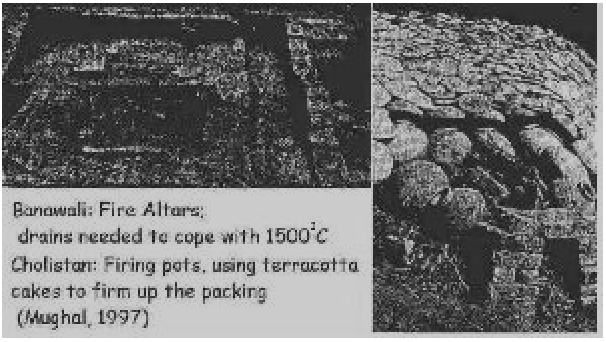
Lakhmirwala (29^0 52'N, 75^0 22'E), Gurnikalan, Hasanpur Two in Mansa tahsil of Bhatinda District (Joshi, JP., 1986, Madhu Bala, 1992, *Archaeology of Punjab*. Delhi: Agam Kala Prakashan: 43-5).. Sketch map (After Possehl, G.L. 1999, Fig. 4.169).

The eight large cities identified are: Mohenjodaro (+200 ha.), Harappa (+150 ha.), Dholavira (100 ha.), Ganweriwala (80 ha.), Rakhigarhi (224 ha.), Lakhmirwala (225 ha.), Gurnikalan (144 ha.) and Hasanpur (100 ha.), the last three are in Mansa Tahsil of Bhatinda District, Punjab. The eight centres supported hundreds of village settlements and farming or pastoral communities. Manasa (as a lake) is mentioned in the R.gveda together with Dr.s.advati and Apaya_, firmly establishing the locus of the Vedic civilization; the locus is coterminus with the archaeological sites on the Sarasvati River Basin. The relative chronology of Vedic culture and Harappan civilization will unravel as the meanings of inscriptions found in archaeological sites get unraveled.

Excepting Mohenjodaro and Harappa, all the other six sites are on thee Sarasvati River Basin. Harappa on the left bank of River Ravi was indeed on the right bank of the River Sarasvati (when River Sutlej had joined the River Sarasvati at Shatrana, thus making it possible for people from Kalibangan to commute by road to Harappa. Mohenjodaro was an island caught between the Western Nara loop and the River Sindhu. As we have noted elsewhere, the River Nara was an extension of the River Sarasvati in the province of Sind.

Rakhigarhi: This site was earmarked for excavation in the 60s, but work began only in December 1997. An area of 224 ha. has been acquired, making it the largest site of the civilization, almost three times as large as Mohenjo-daro. The intervening years saw people lifting seals and other antiquities and selling them off to foreigners. The first season of excavation has covered very little ground: about

30 metres by 60 metres, small for a Harappan site that has the potential of being another Dholavira. One of the five mounds atop the Harappan site belongs to the wakf board and two are thickly populated. Yet the excavation yielded enormous archaeological evidence: a very good granary, similar to the one at Banawali, was found. One of the cells had real barley.



Lots of other grains were also found. An animal sacrificial pit lined with mud bricks and triangular and circular fire altars on the mud floor have also been excavated. Streets, lanes, and a covered drainage system of the Harappan type are also there. Archaeologists also found hearths containing evidence of shell burning for preparing lime (choona). They have yet to infer whether the residents of Rakhigarhi chewed betel leaves with choona, but lime paste has other uses, and they presume it was used to make paste beads, which have been found.

Banawali fire altars (Drains to cope with 1500 C. heat) Cholistan: Firing pots using terracotta (triangula) cakes to firm up the packaging during firing.

A circular potter's kiln, waste products of marine shells, conch, waste of semi precious stones, unfinished beads all suggest some kind of crafts specialisation of the people of Rakhigarhi, who also seem to have brought lapiz beads from Afghanistan and conch from Kutchchh. "They must have had extra regional contacts," infers archaeologist Amrendranath. A copper fishing hook and plenty of animal bones have been found. While the identification process is still on, bones of buffaloes, goats, neelgai, antelope, peacocks have been confirmed. Among the metal objects are gold beads, a gold head band, a white metal bangle, possibly of silver, and copper bangles. A cylindrical seal with five Harappan characters on one

side and a symbol of an alligator on the other is an unusual find from this Harappan site.

Among the terra-cotta, animal figurines outnumber others: they include cattle stock, and seals of dogs with collars. They found a few human figures that were crude as also some balance, weights, utensils. One of the mounds has yielded extended burials, but without the associated finds like pots and pans. "What is bothering us is that below the burial levels, we have found regular habitational deposit. It shows that at a very late stage, the site was deserted and used as a burial ground." says Amrendranath. The five mounds by themselves make Rakhigarhi unique, though they are interconnected. "It seems some site had the grid iron, identical planning. And some like Banawali and Rakhigarhi had different kind of planning," he adds.

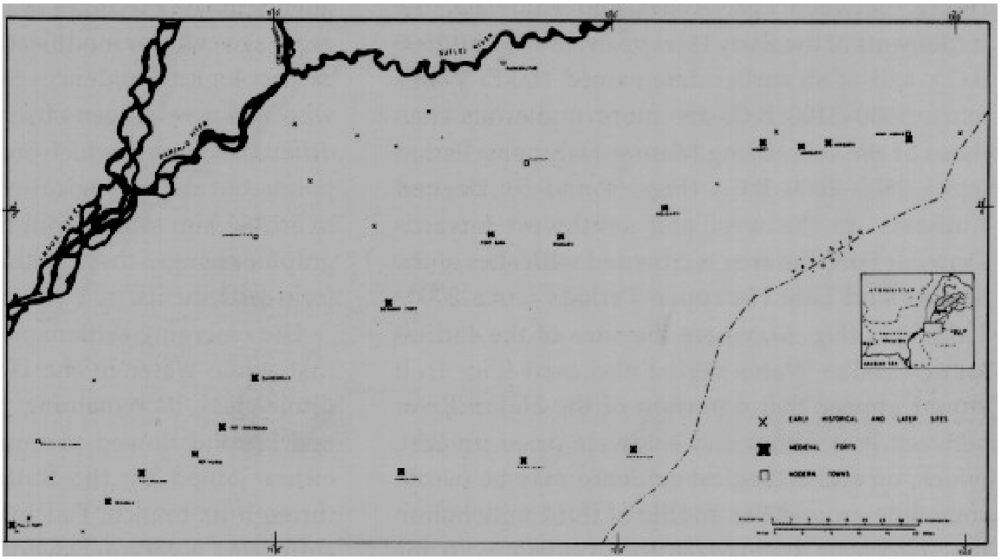
Kunal: Excavations in Kunal on the banks of the ancient-now dry-Sarasvati, in Haryana, exposed three phases of habitation of early Harappan culture. In the earliest phase man lived in pits, in the next the pits were lined with mud bricks, and finally the bricks were piled one on top of the other, and houses were square and rectangular in shape. Among the important things found were two silver crowns with a tiara each, an armlet, a necklace, some bangles, six disc-shaped gold beads weighing a total of 34 grams, and more than 12,000 beads of semi-precious stones like carnelian, agate, steatite, shell, and lapis lazuli. Pre-Harappan and Harappan are not two different cultures, but one continuing process of a single civilisation, excavations at Kunal have shown. Typically, the pre-Harappan phase is marked by the absence of seals and writing. The patterns on the pottery were geometrical, biochrom paintings in black and white. The dimension of bricks was 1x2x3, and there was no sign of the peepal leaf. There were no triangular terra-cotta cakes to be seen. In the Harappan culture there were seals and utensils with writing, pottery carried motifs of trees, plants, birds, animals and fish, and the dimension of the brick was 1x2x4. Pipal leaf was a standard motif, and triangular and other terra-cotta cakes were strewn on many Harappan sites. In Kunal, archaeologists found all these in one go! There were seals without scripts, but pottery with graffiti from

which have clearly evolved many of their scripts. There were geometric patterns as well as natural motifs like peacocks, cranes, bull, and a variety of pipal leaves. Bricks of the pre-Harappan type were found in the second phase and the third phase has houses each of which has used both types of bricks. "Kunal demonstrates the technological development of a culture over a time period," says archaeologist Acharya.

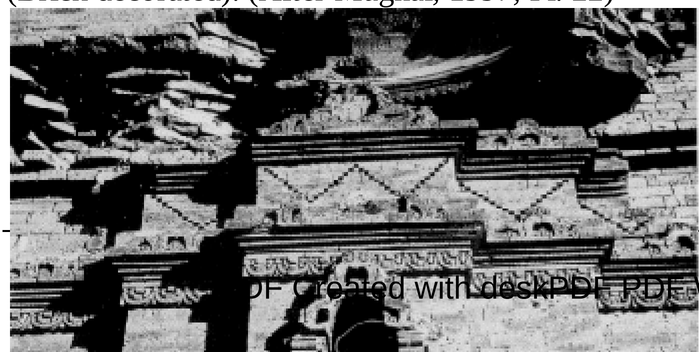
Once upon a time, there lived in Mohenjodaro and Harappa on the Indus Valley a highly organised and urbanised people. Their towns and cities were so well planned that we have not been able to replicate that in India today. Their residences were in blocks and their drainages were far superior to the dirty open nullahs you see in Amritsar or Delhi. They had private granaries, forts and fortifications, sprawling upper, middle and lower towns. They were great mariners, manufacturing goods and trading them far and near. They may not have had currency, but their seals, pottery, arts and crafts suggest that they had a sense of mathematical proportion, standardisation, precision and a writing system. Overnight, their towns were destroyed, and they were driven out, probably by a hoard of horse-riding, fair-skinned aliens. Then followed the Dark Ages, till the birth of Buddha in 600 BC. That is roughly what children learn about ancient Indian history. There is not a clue in the textbooks as to who built that fabulous civilisation, and where they came from. And why did the aliens destroy the towns instead of occupying them? The chapter on the Indus Valley civilisation, and much of ancient Indian history, has to be rewritten, say archaeologists who have been working on the Harappan sites.

Pattan Minara, Hindu Temple on the banks of Sarasvati River (as seen in pre-Independence days before conservation) (After Mughal, 1997, Pl. 23) This could possibly be one of the oldest temples comparable to the later-day Durga Temples, anticipating the stu_pa, s'ikhara- and gopura-styles. The association of Sarasvati_ River with homage to the ancestors is notable. (cf. Balarama's pilgrimage along the banks of the Sarasvati River, as recounted in detal in the Great Epic, discussed elsewhere).

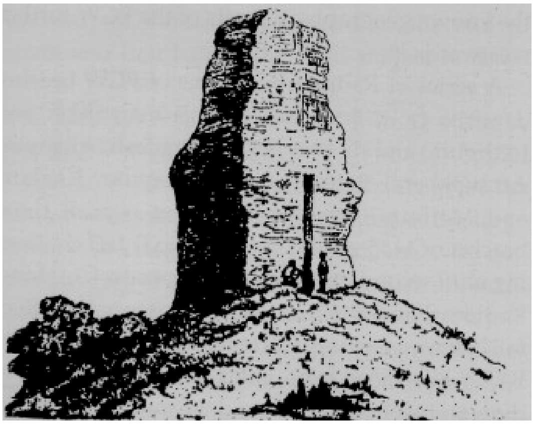
Pattan Minara, Temple (of Sarasvati_ or Su_rya_) on the banks of Sarasvati River.



(Brick decorated). (After Mughal, 1997, Pl. 22)



The lesson being taught is based only on the excavation of Mohenjodaro and Harappa, the first Indus sites to come to light, in



1921-22. Excavations in India, Pakistan and Afghanistan in the last 50 years have shown that the Indus Valley civilisation was not just the story of two towns, it touched Manda on the Beas in the north, Bhagattrao on the Tapti in Maharashtra, stretched to Alamgir on the Hindon in the east, and in the west to Satkangedor near eastern Iran! An area of 1.25 million square kilometres. The civilisation included metros like Mohenjodaro, Harappa, Ghaneriwala (in Pakistan), Dholavira and Rakhigarhi; towns like Lothal, Surkotda, Banawali and Kalibangan, and villages like Kunal. The excavations exposed not just a town or city, but an earlier settlement beneath it, and an even earlier one further down. According to archaeologist Ravindra Singh Bhist (pic: above), before the mature Harappan stage, many regional cultures-Amri, Kot dirji, Kalibangan, Dholavira and Lothal-had coalesced into the cultural umbrella of Harappa. They were strongly bound by common economic compulsions, system and cultural ethos. Could it have been an internal conflict-a civil war of sorts-that brought them to ruin? Bhist says: "Every raja wanted to be the emperor. And so the break-up. And now we have the continuous history of India, from 7000 BC to 600 BC to date. No dark ages." History books have to be revised not only in the context of the Harappan culture, but also other things, these archaeologists suggest. "If we followed history books, the whole civilisation would start and end with Harappa and Mohenjodaro," says Amarendranath. "Nobody teaches students about Kalibangan, which was exposed in the early 60s." He also laments the fact that there is no matching of literature and excavations. [THE WEEK, July 26, 1998].

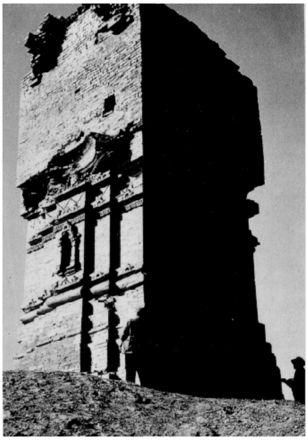
Pattan Minara Temple. Close-up of the niche one one side. (After Mughal, 1997, Pl. 21).The Sarasvati Quest 1985.



Early Historical Sites and Forts along the Ghaggar-Hakra in Bahawalpur province and Sind (After Mughal, 1997, Fig. 7) Dr. LP Tessitori recorded a number of ancient sites and monuments in Bikaner, during 1916 and 1918 and excavated mounds (theris) connected with the 'necropolis of the Johiyas, the descendants of the ancient Yaudheyas.' (*Annual report of the Archaeological Survey of India*, 1917-18, Calcutta, 1920: 21-23). Aurel Stein further explored sites in Bikaner and Bahawalpur, in 1940-41; the Bikaner area was resurveyed in 1951 and 1953 by A.Ghosh who recorded more than 100 sites. Rang Mahal, Kalibangan, Siswal and Mitathal were later excavated. The forts located in Cholistan are: Bara, Bijnot, Bhagla, Derawar, Duhienwala, Falji, Islamgarh, Jamgarh, Kandera, Khairgarh, Khangarh, Liara, Machki, Marot, Mirgarh, Mojgarh, Murid, Nawan kot, Phulra. The early historical period settlement sites are at: 323 Basti Arain (71^0 9' 48"N; 28^0 39' 13"E), 2 Chak (73^0 0' 25"N; 29^0 12' 05"E), 190- Kakkarhar Tibba (71^0 18' 17"N; 28^0 49' 50"E), 361 Pattan Minara (70^0 20' 14"N; 28^0 19' 51"E), 103 Sui Vihar (Buddhist: Kanis.ka dynasty period) (71^0 28' 47"N; 29^0 14' 55"E), 103a Zahir Pir Tibba (71^0 21' 25"N; 29^0 10' 41"E); medieval period sites are at: Bhagla, Chak, Derawar, Islamgarh, Jamgarh, Kandaiwali (Kandera Ther), Khairgarh, Khangarh, Kot Ghunia, Kotla Musa Khan, Kot Murid, Machki, Malka Dahar, Mirgarh, Mojgarh, Rajarwala Dara, Rukanpur, Sanrani Baluch,, Sukkarwala, Swetra, Tillu Ther, Uchh Sharif. Further to the Northeast, there is the

famous fortress of Sirsa (Sarasvati Nagar). It will be interesting to re-visit all the early historical and medieval period sites to evaluate the continuity of the settlements after the Late Harappan. The most significant monument on the banks of the Sarasvati (Ghaggar-Hakra) are those in Pattan Minara, Marot and Sui Vihar. There are scores of forts near Jaisalmer, the early historical site of Rang Mahal (near Suratgarh, on the banks of the Sarasvati River)

Sirsa may refer to the Sarasvata Nagar, a place visited by Arjuna on his way back to Hastinapur from Dwaraka where he witnessed the war between the Vr.s.n.is and the Yadavas. The Sarasvata Nagar was west of Kuruks.etra and Arjuna reached this place after crossing the five rivers of Punjab. He donated this town to Yuyudhani, the son of Satyaki. During his journey, Arjuna also visits Martikavat, Sakraprastha and Indraprastha. . This journey was almost replicated by the Sarasvati Quest group led by M.N. Pingle and V. S. Wakankar, between 19 Nov. 1985 and 20 Dec. 1985, traveling from Adh Badri (Dist. Ambala) to Somnath (Prabha_sa, Gujarat).



Buddhist Stupa, Sui Vihar, near Bahawalpur (Remains as seen in 1870). (Afther Mughal, 1997, Fig. 7A).

“The roots of ‘Sarhind ‘or ‘Vah’ (which join the Chautang at Bhatnagar) are found near Roopad (Rupar) at the foot of the Himalayas where Sutlej rises and flows down elsewhere leaving the aforesaid ancient course...The bed of ‘Hakara’ or ‘Sotar’ is 5 to 8 kms. within the loength of 160 km. The bed is full of black fertile soil and both the banks have a sandy surface. The local peo;le even today name it as Sarasvati...Sri Yudhavir Singh, a Member of Parliament, personally verified in the Documentation center of Hissar that ‘Sarasvati’ is recorded as ‘Sarasut’ in the British Period. Records are available for the description of Abohar Fort built in bricks. They described that during the past several thousand years human

habitations were established in the region which flourished there and were demolished later...Sir Cunningham records four ancient hillocks on the western side of Sirasa (ASI, Part 23, p. 11).

The excavations here revealed a Sun Temple, Yaudheya coins and beautiful statues (now disfigured). Cunningham records that the Sarasvati City (present-day Mustafabad) was destroyed 21 times since the third century AD (*Indian Archaeology Today*, p. 17)...'manus.' in the R.gveda is the present day 'manasa' near Bathinda. Dr. V.S. Agrawal is of the view that Bhadrakar, Toshayana, Ishukar and Roni, the four cities of the times of Pa_n.ini, are the present Tohana, Bhadra, Hissar and Rosi. Asika is Hansi today. Agrodaka is Agroha between Sirsa and Hissar. The forts of Bhatinda and Bhataner were supposed to be invincible even in Medieval period. Goga Chouhan and Gorvan Teele are the ancient temples of Gogamari whereas the remnants of the Buddha period have been found at Tosham...Alberuni has written in his memoirs that when Mohammed Gazni invaded Bharath the learned citizens of Sarasvati Nagar escaped into Kashmir, Benares and other safer places...a stone inscription describing clearly the Sarasvati Nagar, related to Parmar Bhoja Raja and discovered at Sirasa (Sarasvat Nagar) was available at the Museum of Archaeology Department, Gwalior...

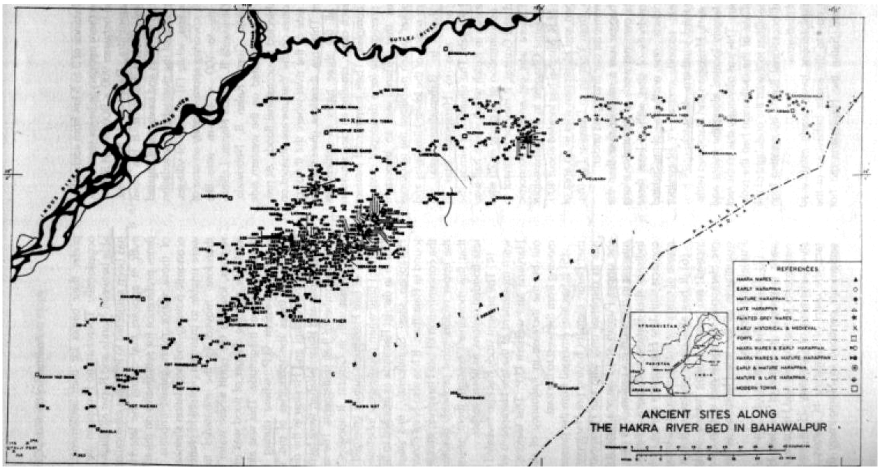
Farishta and other writers have written, in the book *Khitta-A-Sarasvati (Country of Sarasvati)*, on how decisive wars were fought at Bhatinda and Nakhara. During the time of Ebnatoota, the first of invaders, Sarasvati Nagar was a big city. He reached the city via Multan, Aabohar and Aajodhan and reached Sarasvati. The third invader Firoj Shaha also reached Sarasvati Nagar through Multan and Aajodhan. At Sarasvati Nagar he had collected lakhs of 'taks', the then currency, as tax and changed the name of the city as 'Fatehabad'. Akbar later included this city in Hissar District...In the Punjab Gazetteer (Vol. 2A, p. 254) it is said that Sirasa was one of the most ancient of the cities of Bharat. Sir Cunningham discovered a Surya Mandir (Sun temple) and the Yaudheya coins tghere. A fort of the third century discovered there, he says, was perhaps demolished as many as twelve times. This area of the city is presently recognized as Mustafabad...that day would be a golden

day if the name so close to Sarasvati culture is renamed Sarasvati Nagar...Ambaji mountain (Gujarat)...

At Koteshvar one stream of the Sarasvati flows underneath. After playing hide and seek the River finally emerges up the surface at Siddapur to meet the Nalasarovar. The mountains, here, are known as ‘Mainaka’. This range of the Ambaji mountains is the source of Gurjar Sarasvati.”

“This area would therefore qualify fot the most highly urbanized locality of the entire civilization, beginning in the first half of the third millennium, not the second. Moreover, the demonstrated presence of a 225 hectare site at Lakhmirwala in the Early Harappan Stage would demand a thorough rethinking of the culture history of the Early Harappan. No one should believe that there is so much known about Indus culture history, or the urbanization process that took place there in the third millennium, that it would be impossible for a new discovery like this to be ruled out simply because it does not fit present theory…the size of these settlements has important implications that cannot be resolved without excavation.” (Possehl, G.L., 1999, p. 701).

The name ‘mansa’ for the tehsil and the name of a lake in the area called Manasa Sarovar, is also significant in the context of the use of ‘manasa’ in R.gveda while describing the Sarasvati River. There is a distinct possibility that the three large sites of Lakhmirwala, Gurni Kalan One and Hasanpur Two were located on the old courses of Sutlej as the river started migrating westwards with consequent migration of people along these palaeochannels (called Naiwals) which were joining the



Sarasvati River System. Definitive chronology can be established only after detailed excavations are done. The excavations at Ropar did indicate a pre-Harappan phase with Sothi-Siswal ceramics followed by or contemporaneous with Mature Harappan artifacts such as jars, celts, terracotta bangles, beads of steatite, faience and carnelian (Sharma, Y.D., 1989, Ropar. In, A. Ghosh, ed., *An Encyclopaedia of Indian Archaeology*. 2 Vols. Delhi: Munshiram Manoharlal Publishers, Vol. 2: 377-81).

Dry Sarasvati river bed in Cholisthan (Pakistan) and Rajasthan (India)

Sarasvati River sites in Bahawalpur Province (Mughal, 1984, p.515). Many sites are described as ‘industrial sites’ attested by intense use of fire by lapidaries and other workers. Mughal proposes that there were two shifts in the river systems in the Bahawalpur region: the first shift dated ca. mid-third millennium, was the migration of Yamuna and the drying up of Chautang (Drishadvati) as a tributary of Sarasvati River; the second shift was caused by the capture of Sutlej by Beas which cut off the water that joined the Hakra (Sarasvati) east of Yazman, making this portion of the Sarasvati River dry.

Over 400 archaeological sites in the Bahawalpur province, Pakistan (After Mughal, 1982).

Aurel Stein, 1942, A survey of ancient sites along the `lost' Sarasvati River, Geographical Journal, 99: 173-182:

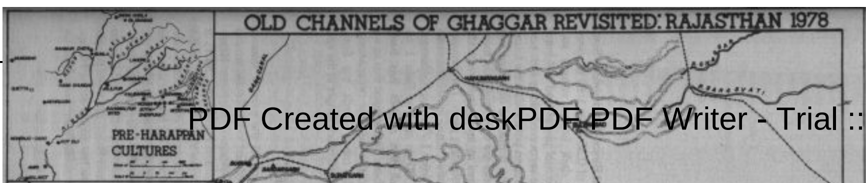
`` ... the sketch-map based on the latest survey shows how great is the contrast between the very scanty volume of water brought down by the Ghaggar and the width of its dry bed within Bikaner territory; over more than 100 miles it is nowhere less than 2 miles and in places 4 miles or more. This bed is lined on both sides by dunes varying in height ... the Ghaggar bed above Hanumagarh, one notes that the number of mounds marking ancient sites long abandoned is here distinctly smaller than farther down the old river bed ... (mounds) known as ther or theri ... Archaeological facts prove cultivation, and with it settled occupation, to have been abandoned much earlier on the Hakra than on the Ghaggar ... trial excavation at Sandhanawala Ther, 3 miles to the north-west of Fort Abbas ... some sherds with incised characters which appear on many inscribed seals from Mohenjodaro and Harappa, chief sites of the Indus Valley cultre ... The great height and size of several others indicate prolonged settlement ... the evidence shows that down to historical times the Ghaggar carried water for irrigation under existing climatic conditions much farther than it does now. This makes it intelligible how the Sarasvati has come in hymns of the R.gveda to be praised as a great river ... upper portion of the ancient bed ... drying up during historical times ... hastened by

diversion of flood water for irrigation brought about by more settled conditions and the resulting pressure of population. Lower down on the Hakra the main change was due to the Sutlej having in late prehistoric times abandoned the bed which before had joined the Ghaggar: the result of a law affecting all rivers whose course lies over alluvial plains ...

The dry bed of the Sarasvati River in Rajasthan is lined with sand dunes. "..that water once flowed well down to Bahawalpur is attested beyond doubt by numerous settlement-mounds, and it is often held that the East Nara in Sind is the continuation of the Hakra, beheaded by the Sutlej". (Spate and Learmonth, 1967: 536). The sand-dunes on the edges of the dry river bed do reprsent river-banks: "That they represent river-banks is proved by the existence on them of a large number of shells, kindly identified for me by the Zoological Survey of India as *Zootecus insularis* (Ehr.), *Indonaia* caerula (lea) and *Parreysia* sp. Some of these, being fresh-water shells, must have got deposited on the banks of the river when it was alive. Small dunes, accumulating at the tops of the sand-banks, and consisting of finer sand drifted from the banks themselves and outside, are of secondary formation." (Ghosh, A., 1952, The Rajputana desert: its archaeological aspect. *Bulletin of the National Institute of Sciences in India*, 1:37-42).

Extracts from ***Memoir Geological Society of India No. 42*****, 1999 (*****Vedic Sarasvati***), pp. 219-223 (from Z. Geomorph. N.F., Suppl. Bd. 45, Berlin, Stuttgart, Mai 1983, pp. 117-151):

Following R.D. Oldham's geological account of the hydrological changes in Northwest India which could explain the ancient courses of the Sarasvati River, C.F. Oldham provides a review of the earth science perspective from the evidence provided by the ancient texts. 'Sarasvati in the R.gveda. In the R.gveda we are told of a large and rapid river flowing from the mountains to the sea. The Maha_bha_rata described the same stream as losing itself in the sands. At the present day we find a



river, wide and rapid during floods, but containing little water at other times, joining another stream of similar character, and thereupon losing its name, the river below the confluence being now called Ghaggar… We find (RV 7.95.1.2: "…Alone among all rivers Sarasvati listened, she who goes pure from the mountains as far as the sea. She who knows of the manifold wealth of the world has poured out to man her fat milk" With reference to this passage, Prof. Max Muller remarks: "Here we see Samudra used clearly in the sense of sea, the Indian Sea, and we have at the same time a new indication of the distance which separates the Vedic age from the later Sanskrit literature. Though it may not be possible to determine by geological evidence, the time of the changed course which modified the southern area of Punjab and caused the Sarasvati to disappear in the desert, still the fact remains that the loss of the Sarasvati is later than the Vedic age, and that, at that time, the waters of Sarasvati reached the sea."…Disappearance of Sarasvati at Vina_s'ana. In the R.gveda nothing is said of the disappearance of the Sarasvati in the sands. At the time of Manu, however, the waters of the sacred river no longer flowed to the sea. From the Maha_bha_rata we learn that "Baladeva proceeded to Vina_s'ana, wehre the Sarasvati has become invisible in consequence of her contempt for S'u_dras and Abhi_ras."…And in another place we find: "Here is the beautiful and sacred river Sarasvati, full of waters; and here is the spot known as Vina_s'ana, or the spot where the Sarasvati disappears. Here is the gate of the country of the Nisha_das, and it was from hatred of them that the Sarasvati sank into the earth, that the Nisha_das might not see her." From a reason being thus assigned for the disappearance it would seem to have been then recognized that there had been a time when the sacred stream did not lose itself in the sands. Although the Vedic accounts of the Sarasvati differ so much from those of less ancient authorities, and from the actual condition of the stream now known by that name, it is very unlikely that the river to which so important a position is assigned in the Brahmanical writings could ever have lost its identity, or that its name and sacred character could have been transferred to another and less considerable stream. Indeed it is tolerably certain that the Sarasvati of the present day is the river mentioned in the Veda and the Maha_bha_rata.

‘Gap in the hills and the course of Sarasvati. The Sarasvati rises in the outer Himalayan range, usually called Siwalik, close to the watershed of Upper India, and not far from the gtap in the hills by which the Jamuna enters the plains…After a south-westerly course of nearly 100 miles, and after receiving its tributaries the Ma_rkanda and other streams, the Sarasvati now joins the Ghaggar near the village of Rasula. Although the river below the confluence is makre in our maps as Ghaggar, it was formerly the Sarasvati; that name is still known among the people, and the famous fortress of Sarsuti or Sarasvati was built upon its banks nearly 100 miles below the present junction with Ghaggar. How the sacred river came to lose its own name and acquire that of its former tributary is not known. It may have been owing to some change in its course in comparatively modern times. There is no mention in the Veda or Maha_bha_rata of any such river as the Ghaggar, or of any important stream between the Sutadru and the Sarasvati. The ancient fortress off Sarsuti or Sarasvati (now Sirsa) was a place of importance upto the time of the early Mahommedan invasions. Its site is marked by immense mounds rising some sixty feet above the plain. Some seven or eight miles to the eastward of Sirsa is another old bed of Sarasvati. This is partially obliterated, but it apparently joined the channel just referred to, not far from Sirsa. It may, however, have once been continuous with the old river bed, called in our maps as Chitrang…

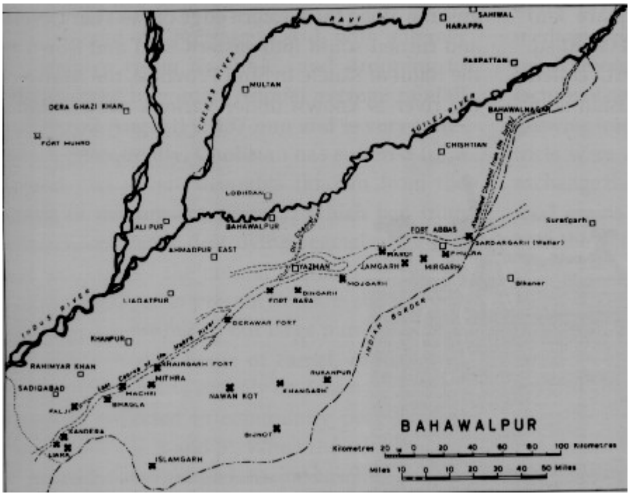
‘Why was Sarasvati lost?…The view held by several writers on the subject appear to be that it was owing to a shrinking of the stream caused by diminished rainfall. This, however, could not possibly have been the cause. It would have involved the existence, previously, of such meteorological conditions as must have rendered the holy land of the Brahmans an uninhabitable swamp…The neighbouring large rivers…some of them, in fact, which are mentioned in the Vedas as being fordable, are so with difficulty at the present day…Sarasvati, Ghaggar, and their tributaries…are fed by rain only; and not by the melting snows…

“It was not, then, owing to the shrinking of its stream that the waters of the Sarasvati lost themselves in the sands instead of flowing onwards to the ocean. Its ancient course, however, is continuous with the dry bed of a great river which, as

local legends assert, once flowed through the desert to the ssea. In confirmation of these traditions, the channel referred to, which is called Hakra or Sotra (perhaps a corruption of Satroda or Satruda, the old name of the Sutlej; just as Hakra is a modified form of Sagara, Sankra, ‘ocean’) , can be traced through the Bikanir and Bahawalpur States into Sind, and thence onwards to the Rann of Kutch. The existence of this river at no very remote period and the truth of the legends which assert the ancient fertility of the lands though which it flowed, are attested by the ruins which everywhere overspread what is now an arid sandy waste. Throughout this tract are scattered mounds, marking the sites of cities and towns. And there are strongholds still remaining, in a very decayed state, which were places of importance at the time of the early Mahommedan invasion. Amongst these ruins are found, not only the huge bricks used by the Hindus of the remove past, but others of a much later make. All this seems to show that the country must have been fertile for a long period, and that ie became desert in comparatively recent times. Freshwater shells, exactly similar to those now seen in the Punjab rivers are to be found in this old river-bed and upon its banks…

“It is not beyond the bounds of possibility that the Jamuna may at some very remote period have taken a westerly instead of an easterly course and joined the Hakra; for, as observed by R.D. Oldham, of the Indian Geological Survey, this old river-bed lies between the fan or talus of the Jamuna, and that of the Sutlej…It would seem that the Sutlej has changed its course from time to time, until at last it joined the Beas, and the two streams flowed in the same channel. It is most likely that the legend related to the Maha_bha_rata, of the Satadru having separated into a hundred channels was founded upon some great changes in its course. The tradition current throughout the tract between the Sutlej and Sarasvati all agree that the Sutlej flowed in the Hakra channel, and that, till then, the country upon its banks was fertile and populosu…

"The Hakra is formed by the union, near Wallur, on the borders of Bikanirr and Bahawalpur, of two large branches. Each of these arises from the junction of several channels, most of them dry, or only containing a little water in the rainy season. In some of them, however, streams still flow for some distance. When the Sutlej changed its course to the westward, and abandoned the eastern arm of the Hakra, the Sarasvati, which had been a tributary, was left in possession of the deserted channel, in the sands of which its waters were swallowed up. It is of course impossible to fix any period for this change, but it may be presumed that it took place between the Vedic period and that of Manu, when we first hear of the disappearance of the Sarasvati in the sands…



Ancient course of the Hakra River and probable channels from the Sutlej River in Bahawalpur (After Mughal, R.M., 1997, *Ancient Cholistan*, p. 19; Fig. 1).

'Rann of Kutch an estuary. It is not difficult to understand the formation of the Rann, if it be considered as the former embouchure of three important rivers (the Indus, Sutlej, and Luni) of which the first and the greatest has long abandoned it. The traditions of all the tribes bordering upon it agree that this expanse of salt and sand was once an estuary. And, as noticed by Burnes and others, places still exist up[on its shores which once were ports… Sufficient evidence has, I think, been brought forward to show that the Hakra did not dry up from diminished rainfall, or from any failure of its source, but that its waters, having ceased to flow in its ancient bed, still find its way by another channel to the sea. We have also seen that the Vedic description of the waters of the Sarasvati flowing onward to the ocean and that given in the

Maha_bha_rata, of the sacred river losing itself in the sands, were probably both of them correct at the periods to which they referred.'(C.F. Oldham, 1893, The Sarasvati and the Lost River of the Indian Desert, *JRAS*, v. 34, pp. 49-76).

R.D. Oldham (Deputy Superintendent, Geological Survey of India) provides a geologist's account in the earliest attempt to unravel the courses of the ancient Sarasvati River: "Of all the problems with which we are brought in contact when we try to unravel the ancient geography of India, none surpass in terest or difficulty thaose connected with the rivers of the Punjab and Sind. Both interest and difficulty result from the fact that, previous to the advent of English, all civilization and every invader have entered India from the Northwest, and tgheir difficulty from the changes that appear to have taken place in the courses of these rivers during the last three thousand years…

"The Lost River of the Indian Desert. We have lost sight of the dry bed of the old river Wandan in Lat. 28^0 16', Long. 70^0 33'. Above this comes a stretch of sixty miles in which the river bed has either been completely obliterated by the drifting sand or at any rate is not marked on the Revenue Survey maps of Bahawalpur, but in Lat. 28^0 46', Long. 71^0 25' we again find a dry river bed which, under the varying names of Hakra, Sotra, Choya, etc. can be traced through Bahawalpur, Bikanir, and the Sirsa districts till it is lost near Tohana in the Hissar district. Although the connection of these two dry river beds has not yhet been traced (unless we may take a passage— Notes on the Lost River of the Indian Desert, *Calcutta Review*, LIX, 17, (1874)—in the essay which has more than once been alluded to mean that the writer had personally traced the connection), there can be but little doubt that the two were originally continuous and are the sole remaining traces of that great river which, according to the traditions prevalent throughout the desert, once flowed through this now barren tract to the sea, or, according to other accounts, to the Indus at Sukkur…

"Another theory, propounded by an anonymous writer in the *Calcutta Review* (LX, 351, 1875) is that the Hakra was originally occupied by the Jamuna or a branch of

it…but it is certain that it could not have done so since the time of Manu, who mentions Jamuna as joining the Ganges at the modern city of Allahabad; and I have shown that the Hakra was probably a flowing river at a later period than that…the most probable theory is that the anonymous essayist (C.F. Oldham, 1874, *Calcutta Review*, LIX, pp. 1-27)…who supposes the Hakra to be the old bed of the Sutlej, which previous to the thirteenth century, did not join the Beas, as it now does, but pursued an independent course to the sea…Mr. Wilson in his final report on the settlement of the Sirsa district…'From the appearance of the Sotar valley and the numerous remains of towns and villages which stud its banks all the way to Bahawalpur, it is evident that at one time it conveyed a much larger volume of water than at present, and probably was the channel of a perennial stream. But though it must have been, as it now, the largest and most important of all the drainage channels between the Sutlej and the Jamuna, it can never have carried a river at all approaching the size to either of these two. The valley is too shallow and shows too few marks of violent flood action for this to have been the case…

"The soil is all rich alluvial clay, such as is now being annually deposited in the depressions which are specimens of those numerous pools which have given the Sarasvati its name, 'The river of Pools'…and the bed of the stream is gradually attaining one uniform slope throughout'…I have quoted this passage as giving a clear statement of the nature of the objections raised, viz., the shallowness of the channel and the difference of its soil from the sandy silt found in the present bed of the Sutlej, and at the same time describing the manner in which it is even now being filled up with the alluvium precisely similar to the existing soil, and different from the sandy silt of the present bed of the Sutlej…

"Another objection which has been raised is, that the Sutlej flows in a depression below the level of the plain over which the Sotar pursues its course, and that neither it nor any of the dry river channels, to be mentioned further on, which communicate with it have been traced into connexion with the Sutlej…With regard to the second objection…rivers flow in places in a single well-defined deep channel, but in the other they spread out over a shallow ill-defined bed or even split

up into several distinct channels…but lower down, where the river flowed in a deeper and better defined channel, the dry bed remains distinguishable and marks the former presence of the river…

“In the Vedas, the Sutlej is several times mentioned under the name of Satadru, but only in one case is it mentioned or supposed to be mentioned in connection with the Beas, and that is the 33rd hymn of the 3rd Mandala, where the confluence of the S'utudri and the Vipas is referred to…it would not prove that the Sutlej did njot pursue an independent course at a subsequent period, unless we could also prove that the present configuration of the ground, the distinction of Khadir and Bhangar, of strath and upland, existed in Vedic times…

“We have now seen that a dry river bed can be traced, practically continuously from Tohana in the Hissar district to the Eastern Narra in Sind…We have seen that the supposed mention of the confluence of the Sutlej and Beas in the Vedas is not conclusive; that, though Ptolemy seems to take the former river into the latter much as is now the case, yet, when we come to the time of the Arab invaders of India, we find a pecular nomenclature of the river, which points to the conclusion that the Sutlej can then only recently have become a tributary of the Beas and so of the Indus; and, moreover, we find a number of dry river channels, all of which lead from within a few miles of the present channel of the Sutlej, and ultimately join the dry bed of the lost river. Taking all these points into consideration, we may well conclude that this Lost River of the Indian Desert was none other than the Sutlej, and that it was lost when the river turned westwards to join the Beas…

“The Sarasvati of the Vedas. Probably the most difficult of all these problems relating to the rivers of Northern India is the persistent reference, in the Vedas, to the Sarasvati as a large and important river. It is impossible to suppose that rational beings would have selected the insignificant streamlet, now known by that name, whose bed contains no water for a large portion of the year, to associate it on equal terms with the rivers of the Punjab and the Indus, still less to exalt it above them all, to describe it as “chief and purest of rivers flowing from the mountains to the

sea", or as "undermining its banks with mighty and impetuous waves." The only conclusion open to us is, then, either that there has been some great change in the rivers of this region, or that the Sarasvati of the Vedas has no connection with the insignificant streamlet which we now cal by that name.

"The latter of these two is the opinion adopted by Mr. E. Thomas (*JRAAS*, XV (new ser.), 1883, pp. 357-386) in an essay on the rivers of the Vedas. According to him, a part of the ancient Aryans, after leaving their native country at the headwaters of the Oxus, remained for some time in the valley of the Helmund, references to which were incorporated in their sacred hymns. After a while they were again compelled to migrate, and, on reaching the Punjab, tried to revive the seven rivers of their original home; unfortunately, however, there were only six large rivers, but the Sarasvati being a stram that lost itself in the lake or tank of Kurukshetra reminded them in a manner of the Sarasvati they had left behind them, the name was transferred to it, and the seventh river was found. In favour of this hypothesis may be mentioned the fact that, in the Zend, the Helmund is called the Harakhaiti, a word identified with the Sanskrit Sarasvati, according to the recognized rules of transliteration, but there is little else that can be produced in favour of this highly ingenious but far-fetched hypothesis. It implies an almost incredible degree of childishness in the ancient Aryans to suppose that they would confuse together a petty streamlet and a large, navigable river simply for the reason that the one ended in a large lake, while the other flowed into a tank of jhil.

"Rejecting the ingenious explanation of Mr. Thomas, there is no alternative but a considerable change in the hydrography of the region… The configuration of the ground west of the high bank of the Jamuna is that of a very broad and gently sloping cone; this is clearly shown by the general directions of the minor water courses west of the Jamuna, which, as a glance at a sufficiently large-scale male will show, radiate from the point where the Jamuna leaves the hills…The Jamuna must, consequently, during the period which geologists call Recent, have flowed sometimes into the Ganges and sometimes through the Punjab; but it is not possible

for geology pure and simple to give the exact date at which the Jamuna last changed its course.

“Two of these now minor drainage channels, the present Sarsuti and the Chitang, are continuous with the Sotar, and die out after approaching within a fes miles of the old high bank of the Jamuna; and it is not impossible that one or the other may mark approximately the course of the Jamuna, or Sarasvati of the Vedic period.

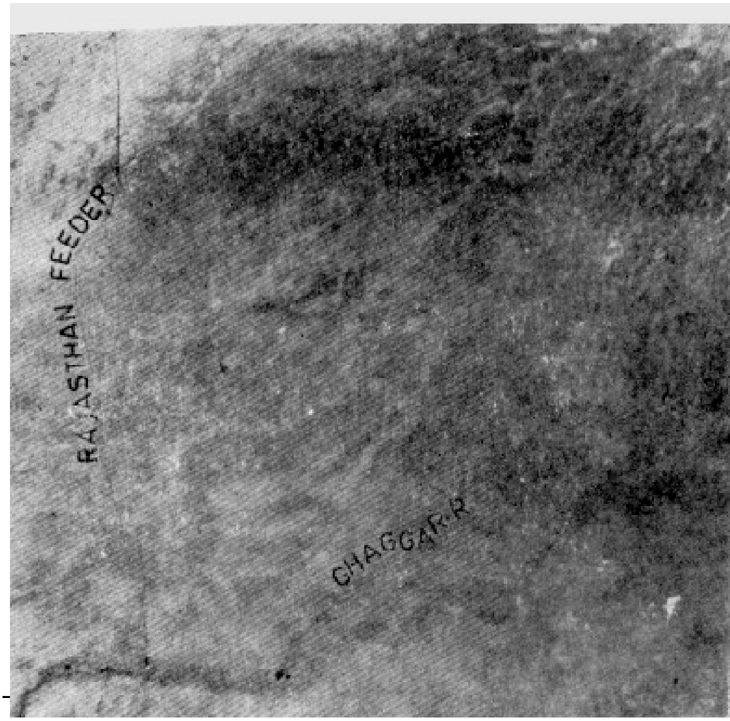
“In this connection, a coincidence may be mentioned which is perhaps germane; when about the commencement of the century, the Brahmaputra, a sacred river like the Sarasvati, broke away from its old course and flowed west of the Madhopur jungle to join the Ganges, the new channel thus formed was immediately christened the Jamuna, a name it retains to this day, while the old channel now deserted by the main stream is still known as the Brahmaputra. Possibly, a similar explanation may be assigned to the name of the Jamuna, which, originally known as the Sarasvati, struck out a new course for itself during the Vedic period and doing so, acquired a new name. If this be so, the native tradition that the old Sarasvati joins the Ganges at Allahabad is, unwittingly, a true statement of fact. [This observation of Oldham gains credence by reviewing some semantics related to the word: there is a possible that the word, ‘Yamuna’, is derived from the root, ‘yam’ meaning ‘ to restrain, to guide towards (RV 1.84.6; 5.73.3; 9.44.5) with derivations such as yami_ = twin (RV 5.47.5); yamya = twins (RV 3.55.1); yamuna = restraining, governing (Vedic.lex.)

“The most weighty and indeed almost the only, argument that can be uirged against this hypothesis must be derived from the mention of both the Sarasvati and the Jamuna in the Vedas, and even in the same verse of the same hymn. It may have been, however, that the Jamuna, after leaving the hills, divided its waters…and that the portion which flowed to the Punjab was known as the Sarasvati whiel that which joined the Ganges was called the Yamuna…

“It may perhaps be thought that there is some inconsistency in thus claiming the Sotar first as an old course of the Sutlej and then of the Jamuna, but this is apparent, not real, for, as I have pointed out, the Sotar takes its rise where the fans of these two rivers meet, and must as soon as they were building up the deposits they are now excavating, have constantly been receiving a supply of water from one or other of the two. It so happens that the last change of course of both rivers, previous to that change of condition which led to their excavating the exting depressed channels, took the one into the Beas, the other into the Ganges, and a dry bed is all that remains of what was once a large river flowing through the fertile land.

“Conclusion. I have now shown that we may take it as proved that there have been great changes in the hydrography of the Punjab and Sind within the Recent period of geology, that there are abundant indications, not amounting to proof, that these changes have taken place within the historic period, and that the most important of them, by which a large tract of once fertile country has been converted into a desert, appears to have taken place after several centuries of the Christian era had sped. It is hopeless to expect an authoritative settlement of the question; the physical conditions cannot be said to favour the idea, but they are far from being inconsistent with so recent a drying up of the “Lost River of the Indian Desert”.(R.D. Oldham, 1886, On probable changes in the geography of the Punjab and its rivers an historico-geographical study, *Journal of Asiatic Society Bengal*, v. 55, pp. 322-343).

“The Sarasvati, called Sarsuti in Hindi, is formed by the junction in the Ambala District of the Punjab of smaller streams descending from the outer Himalaya range of the Siwaliks. The river bed is filled mainly by the drainage of the monsoon-rains which that hill-range receives in abundance. Its water is made by dams to irrigate much ground in Ambala district. Thence it passes along the western portion of the Karnal tract, the sacred Brahmavarta of tradition, into the easternmost part of Patiala territory. There it ceases to carry a perennial flow of water. The wide bed of the river next enters the Hissar District and continuing its southwestern course carries summer floods of a volume varying in accordance with the intensity of the monsoon to the northeastern border of Bikaner. At a distance of some 12 miles before reaching that border, a weir constructed in 1897 now holds up the flood water to form the artificial lake of Out.” (Stein, 1943: 7-8).



Two rivers met near Wallur or west of Anupgarh; the rivers were called eastern and western Hakra by C.F. Oldham. Most of the archaeological settlements on the upper reaches of Sutlej are found along the courses of these eastern and western Hakra river channels.

LANDSAT image of the area

between the present Sutlej and Ghaggar

rivers. The old bed of Sarasvati river and the braided palaeo-channels of the Sutlej are clearly discernible. The frame covers an area of 185 X 185 ims. (After Yashpal et al., 1980).

The western Hakra had three tributaries all of which were called Naiwal (eastern, middle and western Naiwal). These three Naiwals joined near Kurrulwala (29^0 33'N, 73^0 52E), south of the Abohar town. These Naiwals might have constituted the palaeo-channels through which Sutlej joined Hakra.

These naiwals may constitute the remnants of a migratory path of the Sutlej river westward away from the Sarasvati River Basin, and toward the Sindhu River system. In the 13^{th} century A.D., Sutlej had flowed into the Beas valley through two dry beds (one of which was called Dhunda), between the western Naiwal and the present Sutlej.

The eastern Hakra had the tributaries of (1) Chautang (Chitrung, as spelt by Oldham), (2) Sarasvati or Markanda, (3) Ghaggar and (4) Wah or Sonamwal or Sirhind Nadi (this Wah tributary might have led to the name of Wahind for Ghaggar-Hakra). Ghosh traced the ancient channel of Chautang along Bhadra and Nohar upto Suratgarh, where Chautang joined Ghaggar. (Today, the Hansi branch of the Western Yamuna cfanal runs through this palaeo-course). Another river also known as Chautang running parallel to this Bhadra-Nohar Chautang joins the Sarasvati at the town of Pehoa. (This course might have passed through the archaeological site of Banawali).

Sarasvati or Markanda joijned the Ghaggar at Rasula, a few kilometers south-east of the small town of Shatrana. The westernmost tributary, Wah, had joined the Ghaggar east of Sarsa.

(Ghosh, A., 1952, The Rajputana Desert—its archaeological aspect, *Bulletin of the National Institute of Sciences of India*, 1: 37-42; Erikson, K. Gosta, 1959, The dry bed of the River Ghaggar, in: *Rang Mahal*, Hanna Rydh, 22-40. Lund. Sweden.

CWK Gleerup; Suraj Bhan, 1972, Changes in the course of Yamuna and their bearing on the protohistoric cultures of Haryana, in: *Archaeological Congress and Seminar Papers*, S.B.Deo, ed., 125-128, Nagpur, Nagpur University; 1973, The Sequence and spread of prehistoric cultures in the upper Sarasvati Basin, in: D.P. Agrawal and A. Ghosh, eds., *Radiocarbon and Indian Archaeology*, 252-263, Bombay, TIFR; V.N. Misra, 1984, Climate, a factor in the rise and fall of the Indus Civilization—evidence from Rajasthan and beyond, in: B.B.Lal and S.P. Gupta, eds., *Frontiers of Indus Civilization*, Delhi, pp. 461-489).



Kamalagad.ha, Markanda River course (Shri Govinda Kheka_d.e) (After Bapat, V.D., and Umapathy, K.R. (tr.), 1994, *Lost' River Sarasvati*, *Mysore*, Bharatiya Itihasa Sankalana Samithi (tr. from Vakankar, L.S. and Parcure, C.N., 1992, *Lupta Sarasvati_ Nadi_ s'odh* (Marathi).

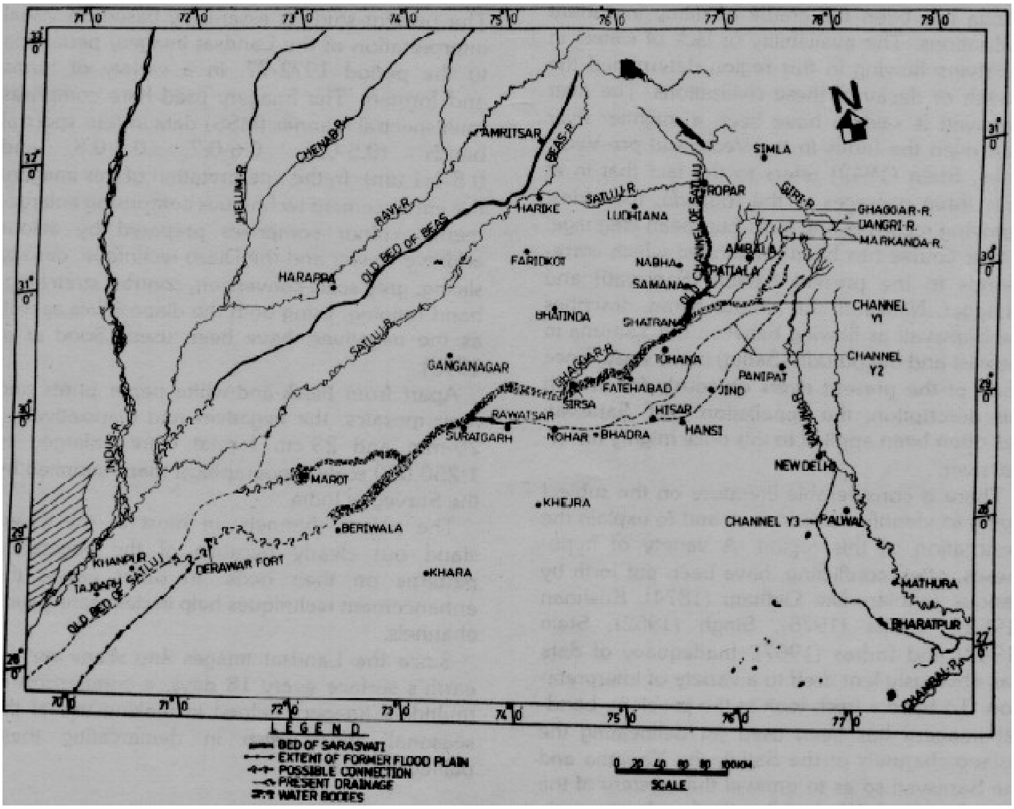
Ramasamy, Bakliwal and Verma (1991) show satellite photographs mosaiced, planimetrically controlled ... Figure 1 shows the last tongue of the Sarasvati river ... The study of remotely-sensed data in the desert tract of Rajasthan shows that there are plenty of paleochannels with well sprung-up tentacles throughout the desert (figure 3). On the northern edge of the Thar-Great Indian desert at the Ganganagar-Anupgarh plains a well-developed set of paleochannels are clearly discernible in satellite photographs (figures 1 and 4). Bakliwal et al (1988) have explained that these well sprung-up paleochannels are traces of the mighty Sarasvati river which once ruled the desert. Yashpal et al (1980) have argued that the paleochannels observed in the Anupgarh plains are the arm of the Sarasvati river, which has been displaced by the present day Ghaggar river ... that the Sarasvati river once flowed

close to the Aravalli hill ranges and met the Arabian Sea in the Rann of Kutch, that it has migrated towards the west, the north-west and the north and has ultimately got lost in the Anupgarh plains ...

Northwestern India with its present day river system and the major palaeo-channels as deciphered from the Landsat imagery (After Yashpal, et al 1980, Fig. 49.1 in Lal and Gupta, 1984).

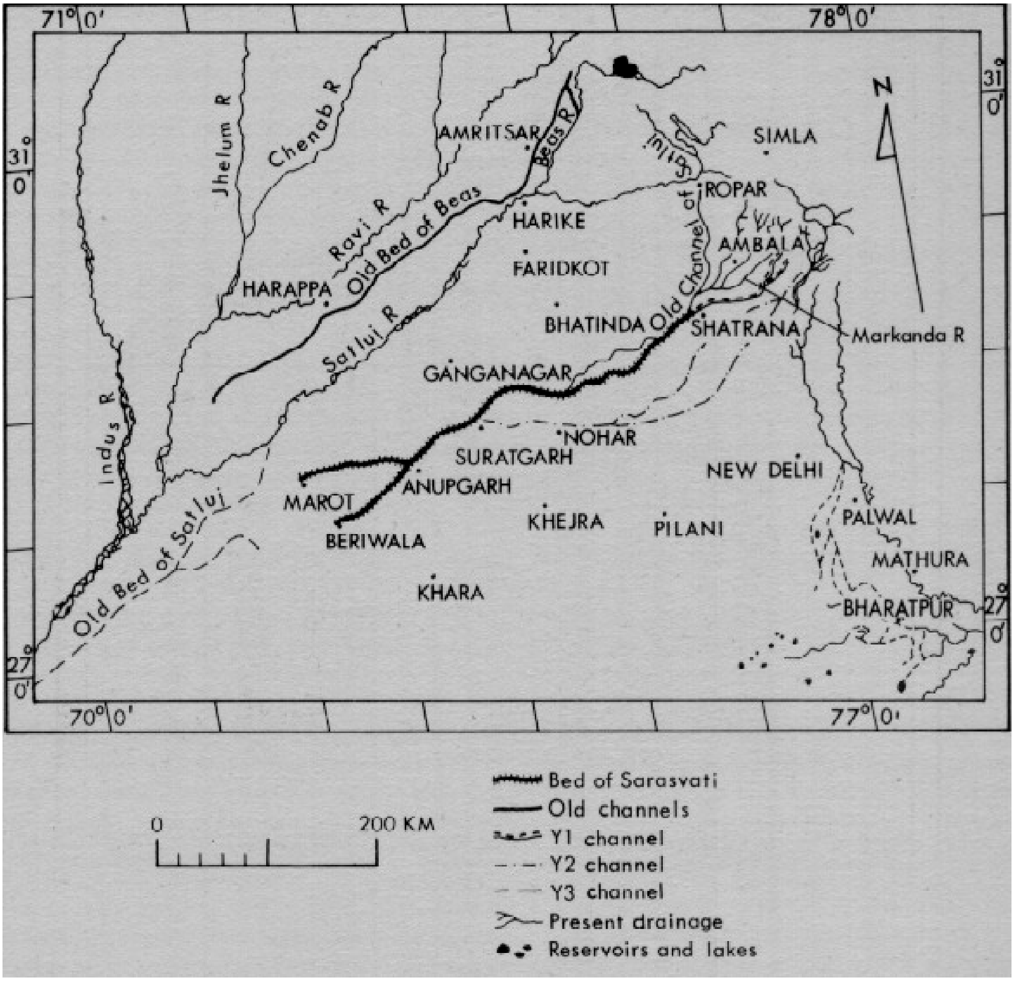
Yash Pal, Baldev Sahai, R.K.Sood and D.P. Agrawal, Space Applications Centre, and PRL, Ahmedabad, 1980, Remote sensing of the `lost' Sarasvati river: Proc. Indan Acad. Sci. (Earth and Planetary Sci.), Vol. 89, No. 3, Nov. 1980, pp. 317-331: `` ... For miles and miles around Marot one finds numerous place names with a suffix toba, which in the local language means a playa (or rann) ... It is obviously improbable for such a mighty river to vanish into a shallow depression (or khadins in the local languages) in its heyday. There is, therefore, a good possibility that the Ghaggar flowed into the Nara and further into the Rann of Kutch without joining the Indus ... `` ... If the bore-hole samples from these areas are analysed, one is sure to come across mineralogical compositions reflecting the signatures of the ancient Sutlej and the Palaeo-Yamuna when they flowed through the Sarasvati bed ... A multidisciplinary approach employing archaeological, mineralogical, chemical and thermoluminescence, combined with remote sensing techniques can provide a clear and consistent history of these changes in the palaeochannels of northwestern sub-continent in an absolute time-frame."

Ghaggar and the Yamuna basins with palaeo-channels. Y1, Y2 and Y3 are old channels of the palaeo-Yamuna indicating that the Yamuna was earlier flowing into



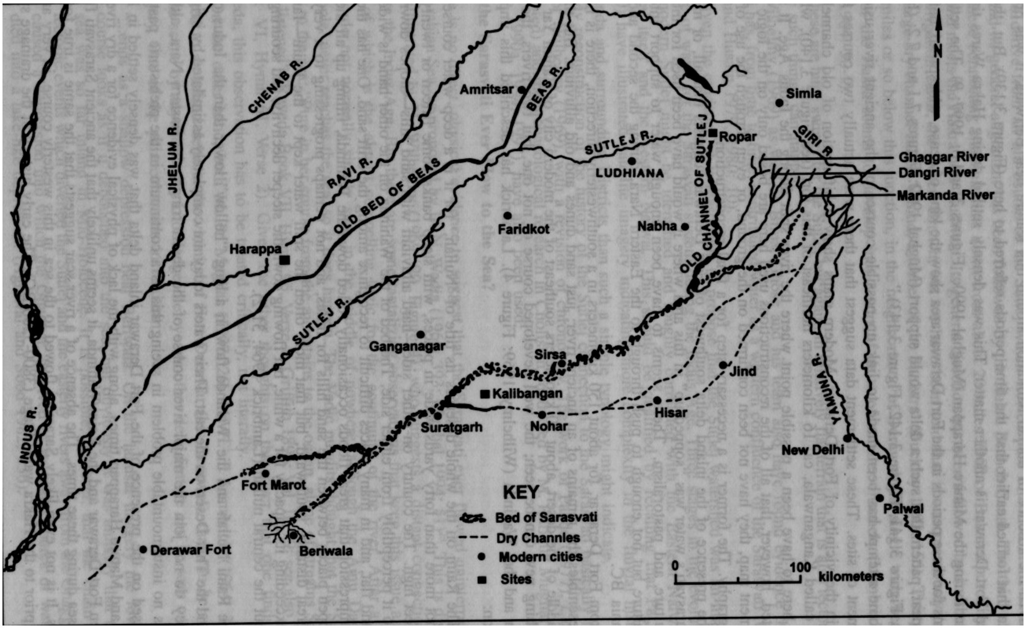
Sarasvati, together with the palaeo-channels of Sutlej. (After Agrawal, D.P and R.K. Sood, 1982, Gregory L. Possehl, ed., *Harappan Civilization*, Fig. 19.4) Sarasvati was a major river to the east of the Ghaggar. This river had three courses traced as Y1, Y2 and Y3. Y1 channel connected to the Ghaggar. Later it followed the Y2 course merging with the Chautang, which later met Ghaggar near Suratgarh. The third channel, Y3 flowed further east and southeast and finally joined the Ganga, probably through the Chambal. The desertion of Y3 channel shifting further

to east, left the various lakes in its course which now are found north of Bharatpur. This Y3 channel perhaps took the eventual couirse of the Yamuna river.



The ancient beds of the Ghaggar has a constant width of about 6 to 8 km. from Shatrana in Punjab to Marot in Pakistan. The bed stands out having a dark tone (in Landsat images) and in a reddish colour in false colour composite satellite images.

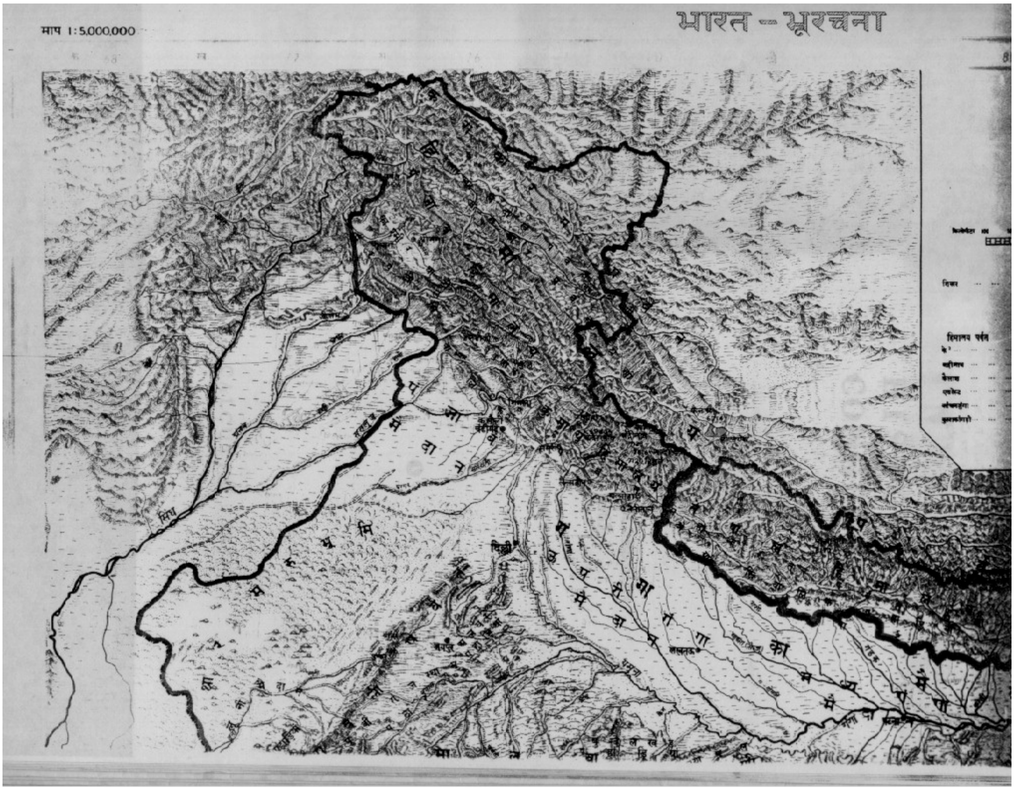
There is a palaeo-channel seen southeast of the river Markanda which joins the ancient bed of the Ghaggar near Shatrana Channel Y1, through which the presend-day Sarasvati channel flows. Another channel, Y2, which corresponds to the



presend-day Chautang seems to join the Ghaggar near Suratgarh. Near Anupgarh, the ancient Ghaggar bed bifurcates and both the palaeo-channels come to an abrupt end; the upper one terminates near Marot and the lower one near Beriwala."It would, therefore, mean that the Palaeo-Yamuna changed its course three times before assuming the present one. In the first instance it flowed through Channel Y1 into the ancient Ghaggar. Later on,l it flowed through Channel Y2, which includes the present Chautang, and met the Ghaggar near Suratgarh. The third time it went southward and passed through the Channel Y3, joining the Ganga through the Chambal." (Yashpal et al., 1980).

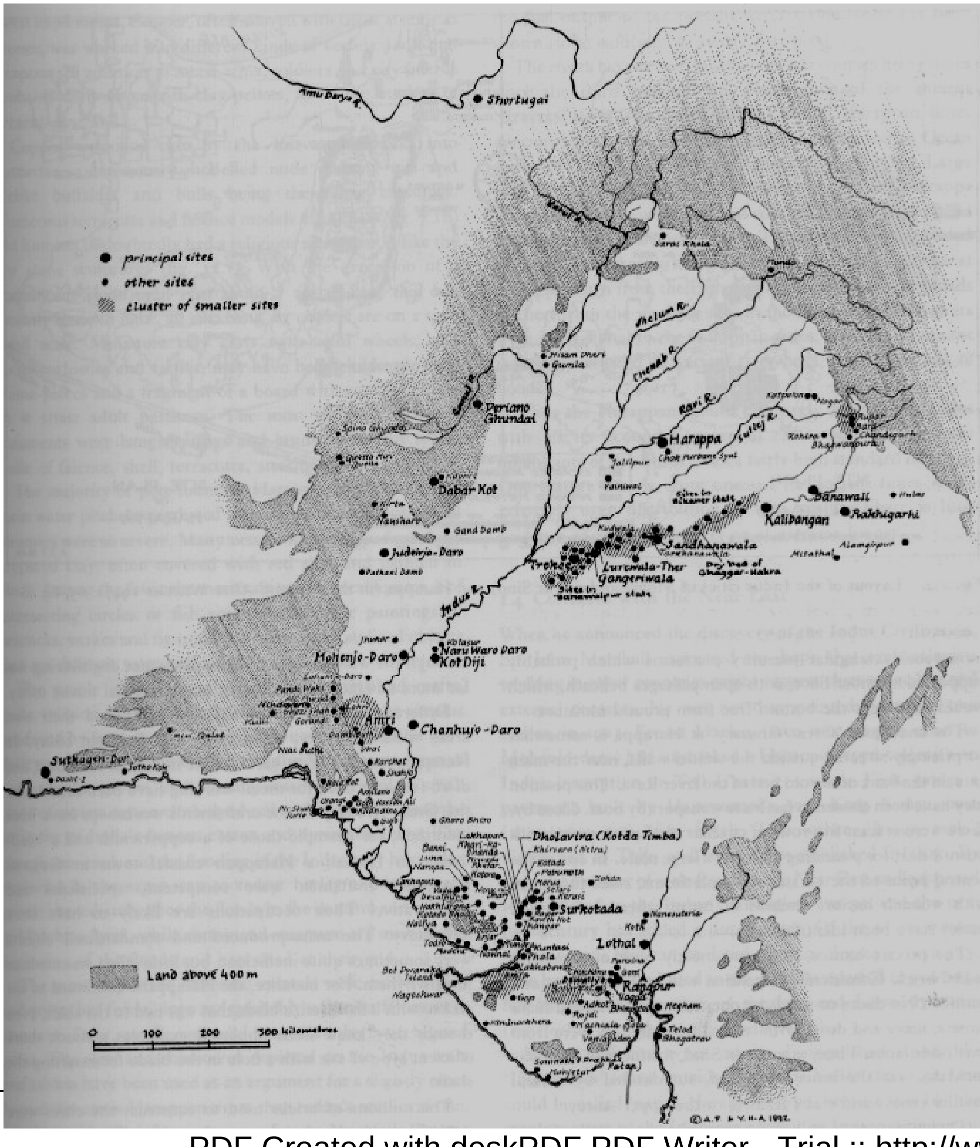
Sarasvati River seen to be lost in the desert near Beriwala wheren an inland delta is formed (After Possehl, G.L., 1999, Fig. 3.139). "(a palaeochannel) ends as a shallow depression near Beriwala. On the LANDSAT imagery the lower course looks as if it debouched into the sea, but obviously it was unlikely that the sea was so far inland in Mid-Holocene. It is possible, however, that the chain of tectonic events which diverted the Sutlej and the easterly rivers away from the Ghaggar, caused a depression into which the Ghaggar, deprived of its major source of water, died into a lake-like depression." (Agrawal and Sood, 1982: 236). No settlements have been found around Beriwala; however, dense Harappan settlements have been found in hundreds around Fort Marot and Fort Derawar. (Mughal, 1997: 9).

Beyond the eastern Hakra flowed the Yamuna river. “It is not beyond the bounds of possibility that the Jumna (Yamuna) may at some very remote period have taken a westerly instead of an easterly course and joined the Hakra, for, as observed by R.D. Oldham of the Indian Geological Survey, this old river-bed lies between the fan or talus of the Jumna, and that of the Sutlej.” (C.F. Oldham, 1893: 55).



Sarasvati River between the Sindhu and Ganga Rivers in NW India: Dotted lines stretching beyond Marubhu_mi (Tha_r) into Bahawalpur province. .*Bharata Bhu_racana*. National Atlas of India, Prel. Edn., Calcutta, 1957, Govt. of India.

Sarasvati Sindhu River Basins: principal archaeological sites (After Parpola, Asko, 1994, *Deciphering the Indus Script*, Cambridge University Press, Fig. 1.3: mature



Harappan and late Kot Dijian cultures).

Ground-truth: Neo-tectonics, ca. 2500 BC

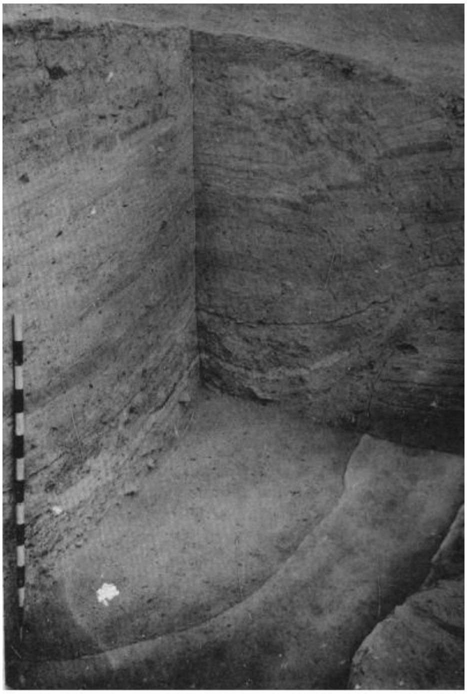
The dates of Harappan culture and their continuing tradition, thus range from 3500 BC and 1000 BC. The area of Harappan settlements extends over 1.3 million sq. km., from Manda in southern Jammu and Kashmir through Daimabad in northern Maharashtra; Mehgam and Bhagatrav in southern Gujarat, Hulas in Saharanpur district (Western U.P.).

Sarasvati_ River was a perennial river ca. 3500 BC; the Sutlej River and the Yamuna Rivers, both emanating from the Himalayas were the tributaries of the Sarasvati_.

This ground-truth alone establishes the patterns of ancient civilization settlements found on the Sarasvati River Basin and the virtual absence of any archaeological site west of Rupar on the banks of the present-day course of the River Sutlej.

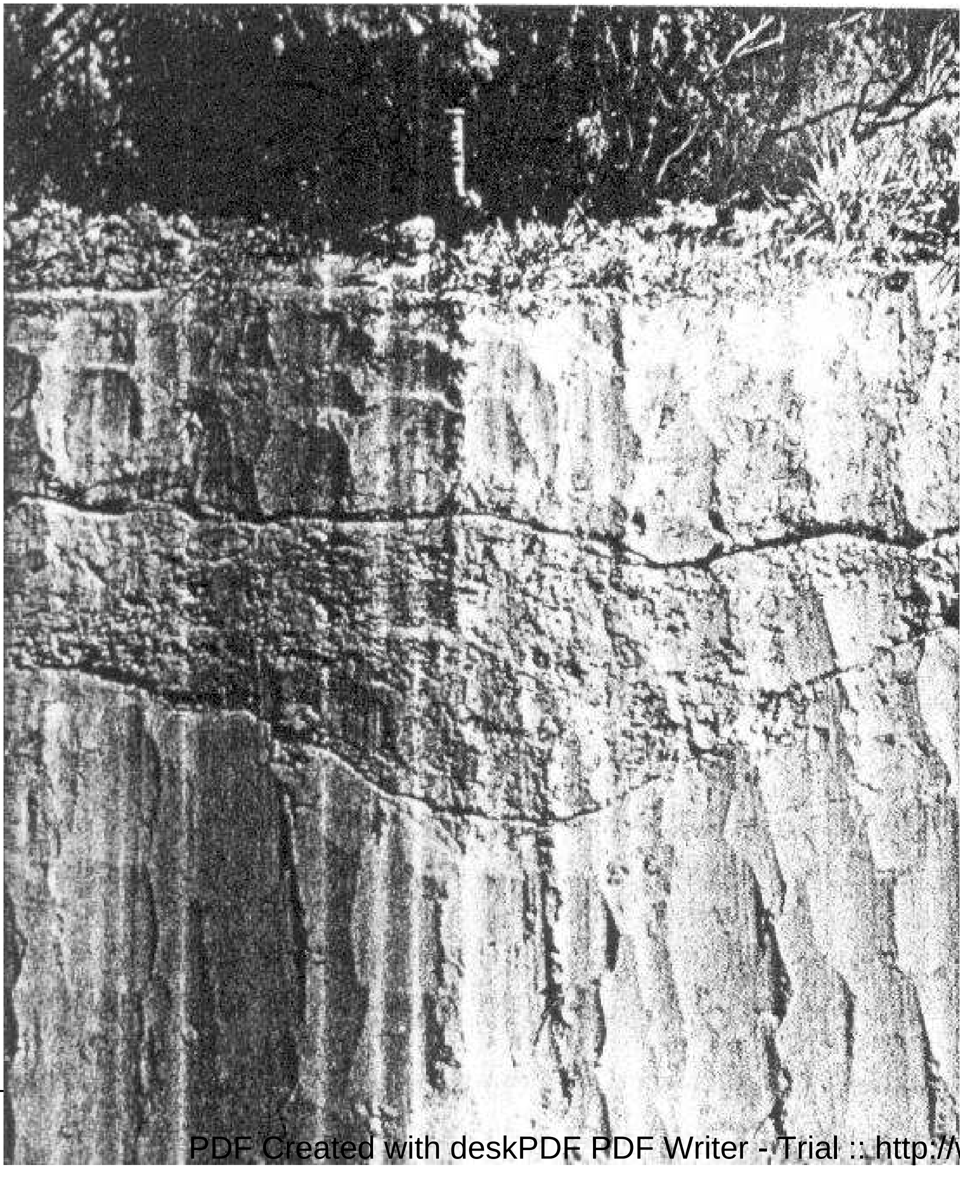


Kalibangan : faulted walls and strata resulting from an earthquake. "Interest attaches to how the Period I settlement at Kalibangan got abandoned. Towards the end of the fifth



structural sub-period there seems to have occurred an earthquake, the scars of which are left at the site in the form of faulted strata and cleft walls." (B.B. Lal, 1997, opcit, p. 78).

In the upper part of the photograph, a black layer is seen ruptured at three places



resulting in four steps. Three near-vertical clevage lines are seen in between the ruptured parts of thiis layer. After this quake, the site was abandoned. In between the ruptured parts of the layer are seen near-vertical cleavage lines. These are an indication of some tectonic disturbance. After this shake-up, there was no further occupation at the site and the site was abandoned. This evidence is substantiated in another part of the site showing faulted mud-brick walls. Two successive mud-brick walls are shown sunken and cleft, with a pronounced cleavage in the lower wall. "The most plausible explanation seems to be the occurrence of an earthquake which not only destroyed the houses but also forced the inhabitants to leave the site. This event may have taken place around 2700 BC, since, after a break, the reoccupation of the site by the Mature Harappans is ascribable, on the basis of radiocarbon dates, to ca. 26th century BC." (Lal, opcit., p. 66)

In the photograph, two successive mud-brick walls are seen sunken and cleft. The cleavage is more pronounced in the lower wall. The successive black and grey layers are seen immediately below the lower wall. These layers are also ruptured and follow the near-vertical clevage line of the wall itself. The quake could have occurred around 2700 BC since, after a break, the reoccupation of the site by the Mature Harappans is ascribed on radio-carbon dating to ca. 26th century BC.

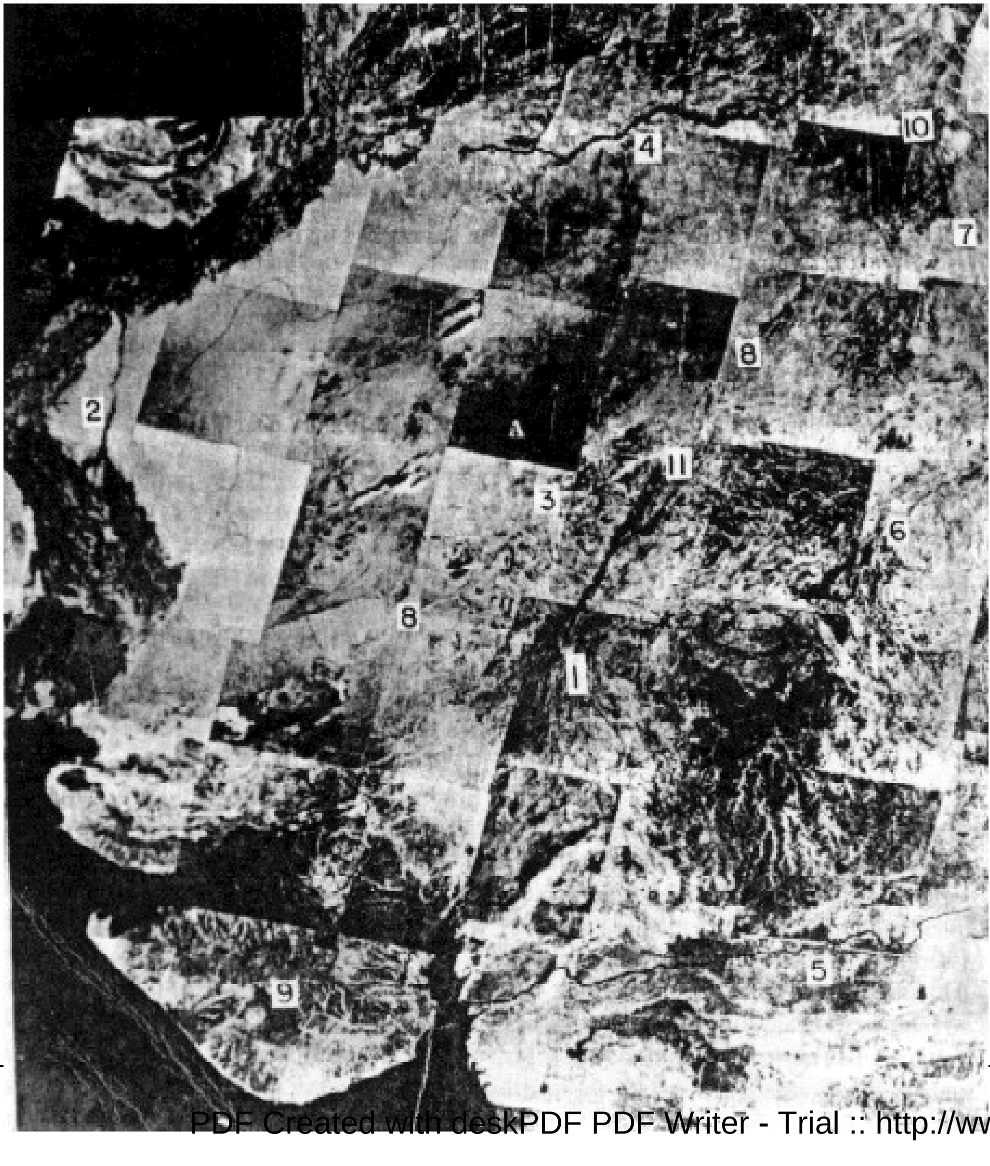
Cultural stratum of Harappan times between two strata of riverine silt, proof of the temporary status of settlements close to the Indus flood plain. Picture was taken at a point midway between the river and Moehnjodaro (Water A. Fairservis, *Roots of Ancient India*, New York, Macmillan and Co.,1971, Plate 27).

Ground-truth: Luni-Sukri lineament (Tectonic and structural control of NW India); Rise of the Aravalli Ranges and River migrations

Forced eastwards, the Sarasvati was progressively robbed of its waters: first by the Yamuna, then by the Sutlej -- both rivers, along with the Tons, were once a part of its massive expanse. A branch of the Chambal cut northwards in a channel deeper than the Sarasvati, finally beheading the great river. This new channel became the

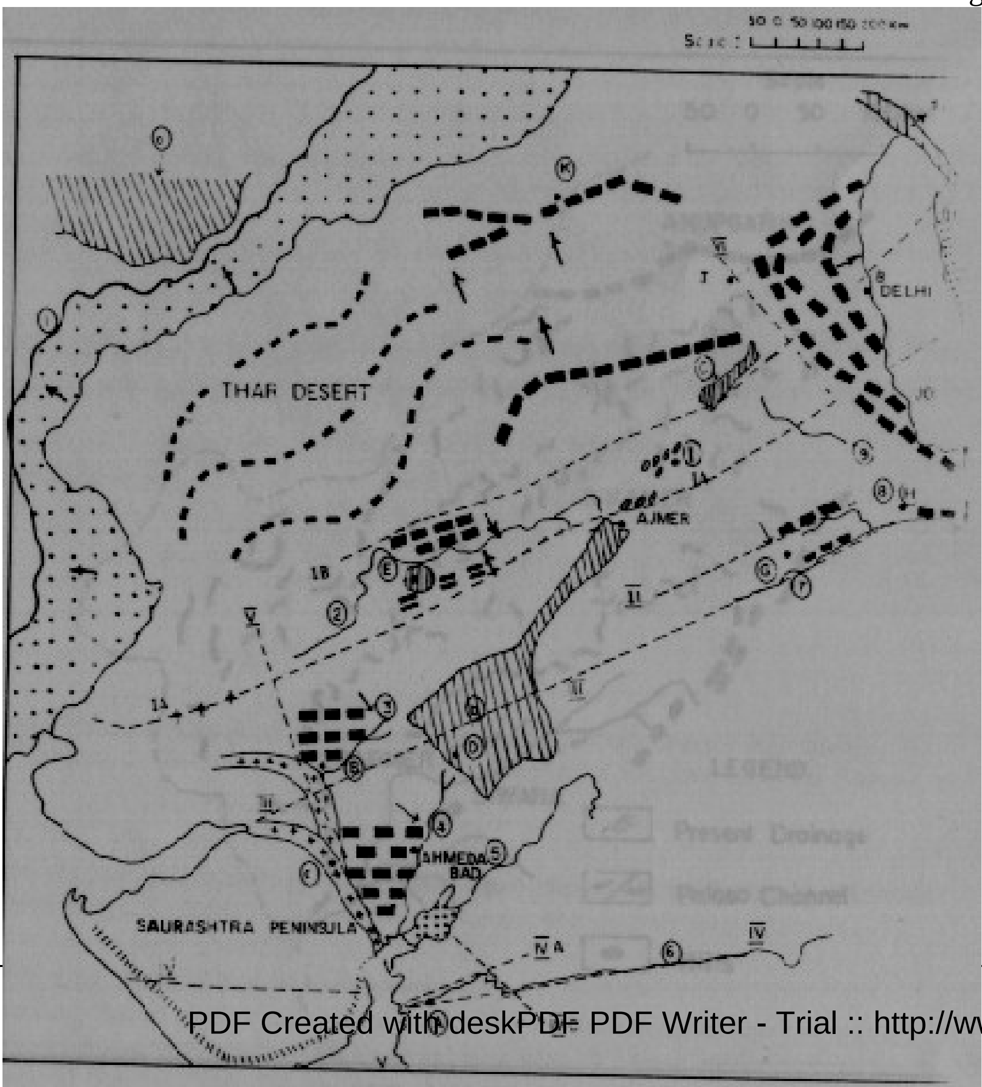
Yamuna, which migrated eastwards. Similarly, the Sutlej migrated westward. A geological paroxysm in the Aravallis pushed it into a U-turn at Rupar, Punjab, forcing a complete abandonment of the Sarasvati, sending the Sutlej into the arms of the Indus.

Composite of satellite images showing the geomorphological architecture of Western India. 1. Aravalli mountains; 2. Indus and its flood plain; 3. Luni river; 4. The last tongue of the Sarasvati River in Marubhu_mi; 5. Narmada river; 6.



Chambal river; 7. Yamuna river; 8. Luni-Sukri lineament; 9. Saurashtra Peninsula; 10. Delhi; 11. Ajmer (After Ramaswamy, S.M., Balkiwal, P.C. and Verma, R.P., 1991, Remote Sensing and river migration in Western India, in: *International Journal of Remote Sensing*, Vol. 12, No. 12, 2597-2609; Fig. 1).

The Sarasvati's demise indicates how dramatic tectonic movements can change the



face of a society. Betrayed by its two snow-fed sources, the Sarasvati was left with the waters of petty streams rising in the puny Shivaliks. Its twin sources survive to this day. The Sarasvati was born in the Banderpunch (monkey's tail) massif in the Garhwal Himalayas. This is today the source of the independent Tons, one of the Sarasvati's source streams. Beyond the Indian

Himalayas in Tibet near the holy lake Mansarovar is Kapalshikhar, the other source of the Sarasvati. The river is still there, known locally as the Mang Nang Tsangpo; further downstream a Survey of India map actually calls it the Sarasvati.

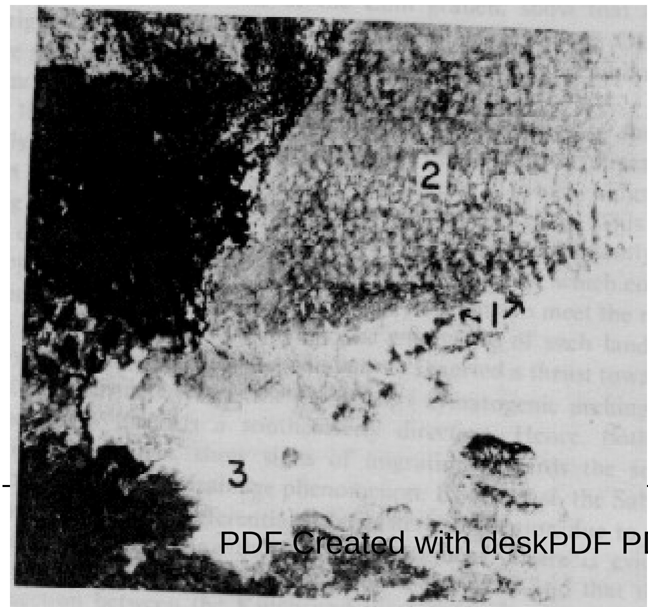
Without its snow-bound origins, the Sarasvati became a shadow of its former self. Its people migrated upstream and settled in today's Haryana and western Uttar Pradesh. There seems to be archaeological evidence to this movement: The total absence of late Harappan settlements in the area of the Sarasvati is in sharp contrast to the dramatic increase in habitations in the plains of Haryana and western Uttar Pradesh. There is also a remarkable scarcity of Harappan sites around what are today's Yamuna and Sutlej. This is again in sharp contrast to the archaeological gold mines turning up in the dry channels of Punjab, Rajasthan and Sindh in Pakistan.

Finally, only flood waters flowed down the Sarasvati's once vast channel. It remained dry for several centuries, though some water again found its way in during the early centuries of the Christian era. The Sarasvati's decline and the loss of its civilisation are an indication of how tectonic shifts can combine with localised climate change to dramatically transform human settlement. As the shifting Aravallis chopped off the Sarasvati's waters, the climate too was changing. Over the years western Rajasthan, once a green, rich expanse with extensive rainfall, gradually turned into a parched, desert land. Where there was once a torrent of water, there remained nothing but tonnes of drying sand, a few lakes that survive to this day, and of course the veins of groundwater under the earth.

River Sarasvati's desiccation also demonstrates how central rivers have been to civilisation and culture. With the Sarasvati gone, its place in mythology was taken over by the Ganga. To this day, it is the Ganga that is predominant to India's Hindu consciousness. But the Sarasvati, as the drilling rigs at Ghantiyal Ji should reveal, has not disappeared altogether.

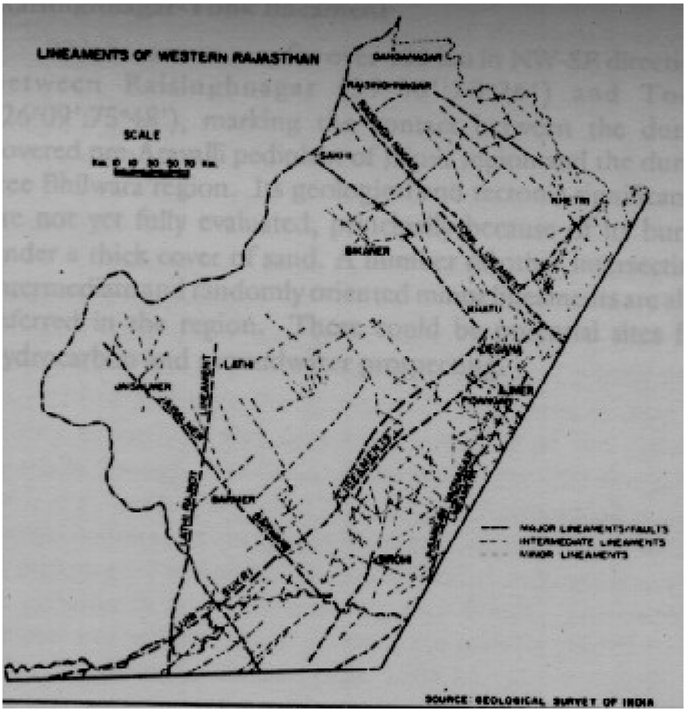
The great river will flow again, its spiritual form will regain its Vedic glory, as the legacies of the river are flooding back all over again.

The collision of the Deccan plate with the Tibetan plate accounts for the landmass of Bha_rat joining with the rest of Asia along the Burmese border, across the Ganga valley and the front of the Himalayas and south along the mountains of NW Frontier and Baluchistan. The flow of the Ganga is along the deep syncline which is filled with alluvium. The resultant effects have been the pushing back and thrusting up of the Himalayan ranges. Sindhu flows along another syncfline, a down warp and a tear as the Deccan plate pushes northward. This plate tectonic activity has contributed to the occurrence of earthquake with the Himachal Pradesh on a 0.85 isoline prone to recurrent earthquakes.



Kutch region; satellite image; 1. Luni-Sukri lineament which is reactivating even in Pleistocene times; 2. Dune field; 3. Marine landforms."The Luni-Sukri lineament is one of the few major lineaments extending from the Great Rann of Kutch in the south-west to Dehradun in the north-east, with a general NE-SW trend and it shows characteristic signatures of Pleistocene

reactivation, namely: (a) it manifests itself as a linear contact between the dunes and the Rann in the Rann of Kutch region with frequent seismicities along it; (b) it occurs as two sub-parallel lineaments in the Ajmer sectgor along the intersection of which the Aravalli mountains are dissected, dismembered and subdued; and, it finds expression as a tear fault in the Siwaliks of the Dehra Dun region thus displaying significant evidence of Pleistocene reactivation.” (After Ramaswamy, S.M., Balkiwal, P.C. and Verma, R.P., 1991, Remote Sensing and river migration in Western India, in: *International Journal of Remote Sensing*, Vol. 12, No. 12, 2597-2609; Fig. 8; pp. 2603-2605).

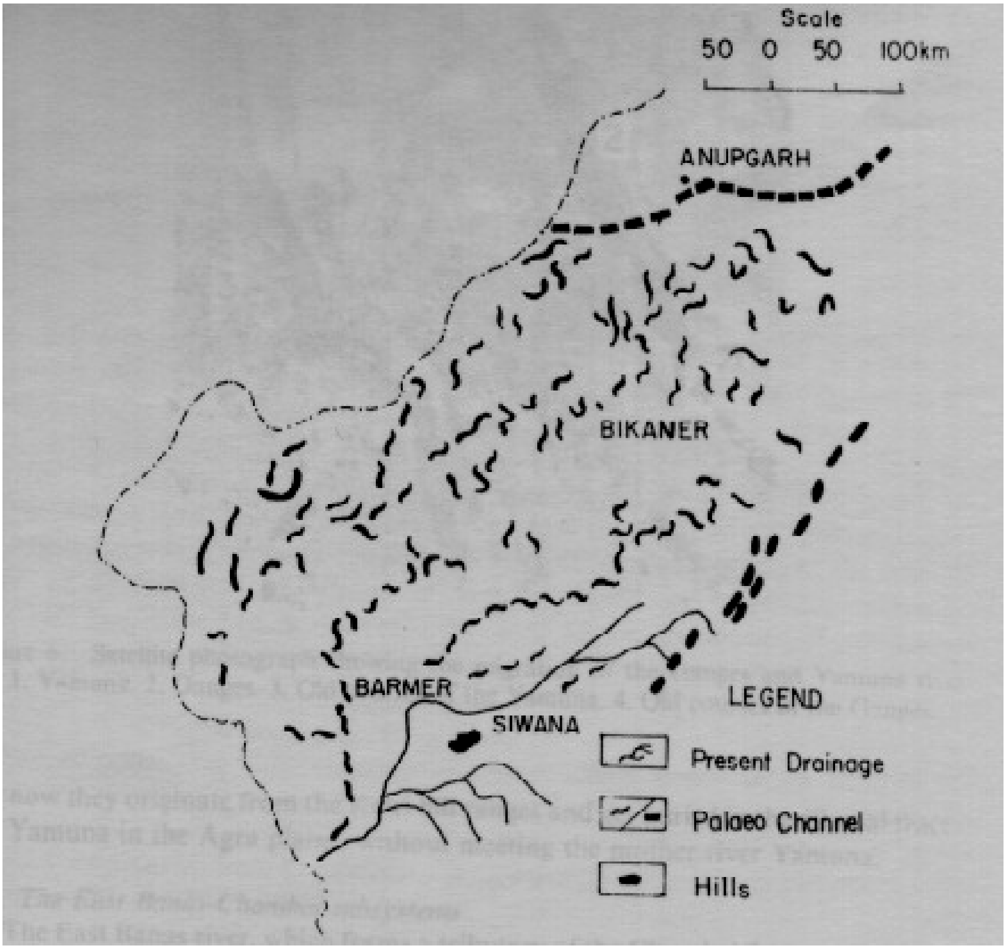


Luni-Sukri and other lineaments of Rajasthan; The 750 km. long Luni-Sukri lineament is aligned along the Luni and Sukri rivers. It extends from the Great Rann of Kacch to the Sambhar lake. In the southwest it marks the contact between the Great Rann and the dune fields, and controls the northern extent of the Great Rann. Occurrence of aligned earthquake epicenters of different dates from 1819 to 1976 AD along it in the

Kacch area suggests its neotectonic potentiality. (After Dhir, R.P. et al., 1992, in: Singhvi, A.K. and Kar, Amal, eds., *Thar Desert in Rajasthan: land, man and environment*, Bangalore, Geological Society of India, p. 30).

River migrations in Western India . Present day channels, paleocourse and lineaments which were interpreted in different parts of satellite and aerial photographs were mosaiced, and planimetrically controlled maps were generated. (After Ramaswamy, S.M., Balkiwal, P.C. and Verma, R.P., 1991, Remote Sensing and river migration in Western India, in: *International Journal of Remote Sensing*, Vol. 12, No. 12, 2597-2609; Fig. 2). a. Sulaiman hills; b. Aravalli hills; c. Khetri hills; d. Siwaliks; 1. Sindhu R.r; 2. Luni-Sukri R.; 3. West Banas R.; 4. Sabarmati R. 5. Mahi R.; 6. Narmada R.; 7. Chambal R.; 8. Banas R.; 9. Banganga R.; 10. Yamuna R.; 11. Ganga R.; A. Broach; B. Radhanpur; C. Virangam; D. Ambaji; E. Siwana; F. Agra; G. Sawaimadhopur; H. Dholpur; I. Sambhar lake; J. Tosham; K. Anupgarh; L. Dehradun; --- Lineaments.

→ Direction of river migration; ---Old river course; ... Ancient shore line +++Earthquake epicenters; -- -Palaeo channels.



"The area under study forms part of the Great Indian Desert and is dominated by semi-arid landforms. The Aravalli mountains, which occur in approximately a

SSW direction, extend from Ambaji in the south, to Ajmer in the north and beyond Ajmer they continue as isolated hills upto Delhi. These mountain ranges act as a major drainage divide, their western and southern slopes acting as a catchment zone for the Arabian seabound rivers, while their eastern and northern slopes form catchments for the rivers which flow into the Bay of Bengal.” (After Ramaswamy, S.M., Balkiwal, P.C. and Verma, R.P., 1991, Remote Sensing and river migration in Western India, in: *International Journal of Remote Sensing*, Vol. 12, No. 12, 2597-2609; pp. 2599-2600).

”Archaeological evidences and remote sensing records indicate that the courses of many of the rivers of the plains have undergone the periodic alterations in and around the area of Saurashtraand Kutch peninsula. Various evidences and explanations are advanced about the migration and extinction of the once mighty river Sarasvati. Similarly the reports are there to suggest that river Indus once upon a time flowed to the sea through Gulf of Khambat prior to now occupied position via Great Rann of Kutch. The fluctuations in the course of these rivers must have left their imprints preserved in the oceanic and marine environment in the form of paleochannels. The evidences of such remnants have been encountered in the recently conducted shallow seismic surveys at the confluence of Kori Creek area of Kutch district of Gujarat State in the form of two ancient channels. These paleochannels of 4 to 5m topographic depression which extend about 200m in width are located at 6m water depth and buried l0m below the present plain of seafloor. We see that the present or in the recent past, drainage system of the area is not capable of forming the paleochannel of such magnitude. These paleochannels are suggestive of some ancient major river or its branches of drainage system flowed to the sea through the present creek system. In the absence of the precise dating and detailed survey, we are not concluding the source river created these paleochannels but postulate in the background of the archaeological, historical and paleoclimatic information that these channels were part of drainage system of Indus/Saraswati.’ (Nigam, R., Pathak, M.C., Hashimi, N.H., Kotnala, K.L., and Chaturvedi, S.K. *Search for Evidences of Ancient River Channels of Indus/Sarasvati in Shallow Sea, Kutch (Gujarat),* Abstract of paper presented in

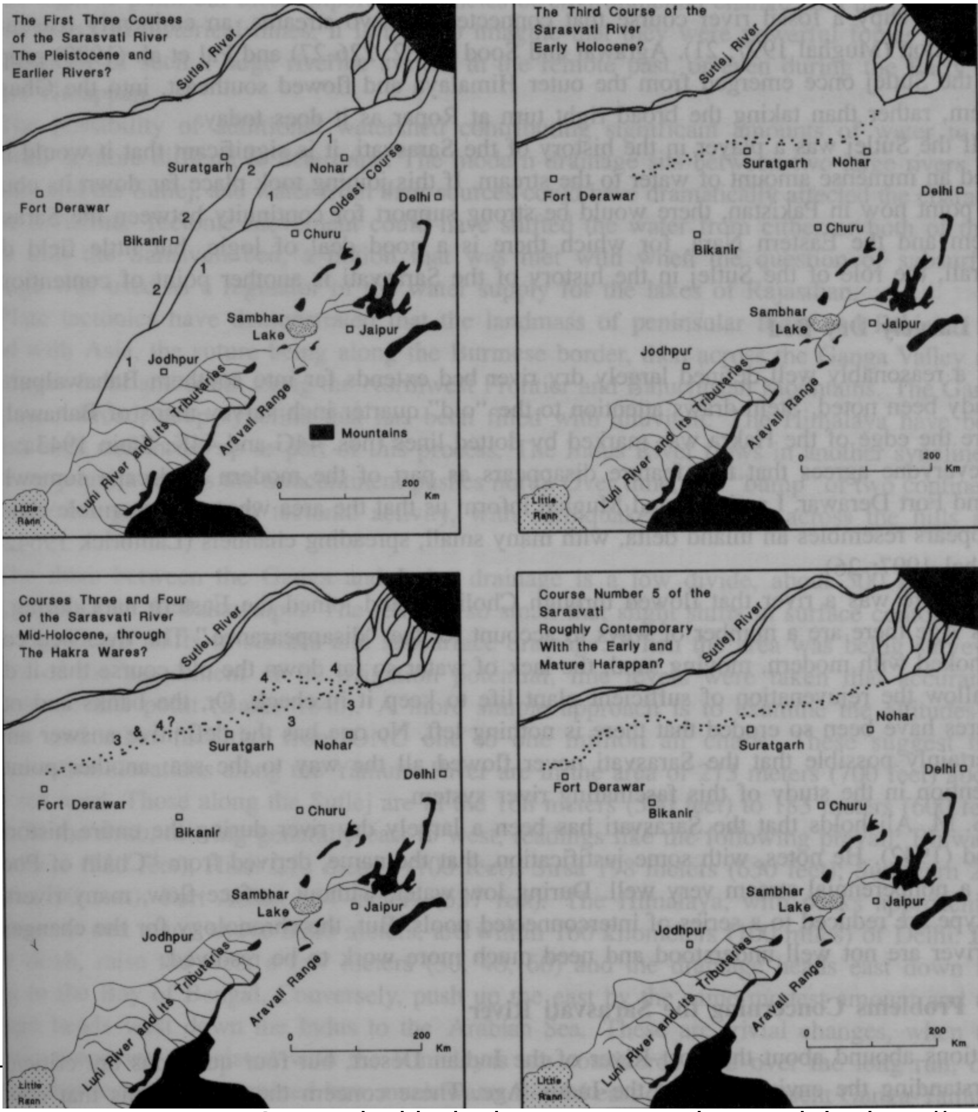
Second International Conference on Marine Archaeology, 8 to 10 January 1999, Institute of Oriental Studies, Thane;
http://www.orientalthane.com/seminars/marine/5.htm)

Palaeochannels of the Thar Desert (Marubhu_mi) . “The study of remotely sensed data in the desert tract of Rajasthan shows that there are plenty of paleochannels with well sprung-up tentacles throughout the desert. On the northern edge of the Thar-Great Indian desert at the Ganganagar-Anupgarh plains a well-developed set of paleochannels are clearly discernible in satellite photographs. Bakliwal et al (1983) have explained that these well sprung-up palaeochannels are traces of the mighty Sarasvati river which once ruled the desert. Yashpal et al (1980) have argued that the paleochannels observed in the Anupgarh plains are the last arm of the Sarasvati river, which has been displaced by the present day Ghaggar river. The studies of the above workers and the present detailed study show clearly that the Sarasvati river once flowed close to the Aravalli hill ranges and met the Arabian Sea in the Rann of Kutch, that it has migrated towards the west, the north-west and the north and has ultimately got lost in the Anupgarh plains...When the Sarasvati flowed in a southwesterly direction it was flowing against the northeasterly moving sand advance in the Thar desert. It can be concluded, therefore, that the Sarasvati river could not overcome such a sand advance and hence that it started drifting towards the north with a rotational migration in a clockwise direction until ultimately it was buried in the Anupgarh plains.”(After Ramaswamy, S.M., Balkiwal, P.C. and Verma, R.P., 1991, Remote Sensing and river migration in Western India, in: *International Journal of Remote Sensing*, Vol. 12, No. 12, 2597-2609; Fig. 3; pp. 2600, 2608).

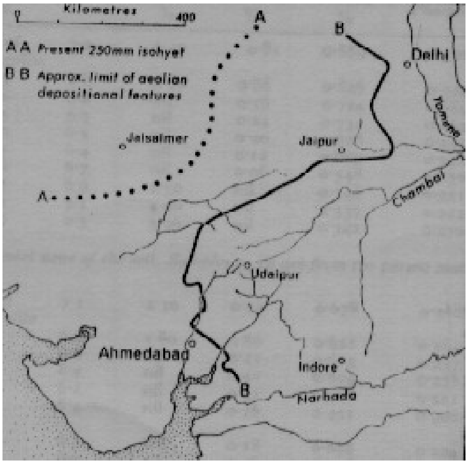
The area to the west of the Aravalli ranges is covered with deep alluvium, barring a few outcrops of rocks which date from Precambrian to Eocene times.(Roy, B.C., 1959, Geological Map of Rajasthan. Economic Geology and Mineral Resources of Rajastghan. *Memoirs of the Geologifcal Survey of India*, 86). So much alluvium should have been brought in by the Sarasvati River system. The Luni River system is not large enough to explain the extent of alluvium. On reconstruction of the

prehistoric river systems west of the Aravalli ranges is that the combined headwaters of the Ghaggar, Sarasvati and Chautang originally flowed past Nohar and joined the Luni river 450 km to the south.

Sarasvati River: ancient courses joining with the Luni river (After Ghose, B., Kar, A., and Husain, Z., 1980, Comparative role of the Aravalli and the Himalayan river systems in the fluvial sedimentation of the Rajasthan desert. *Man and Environment*, 4: 8-



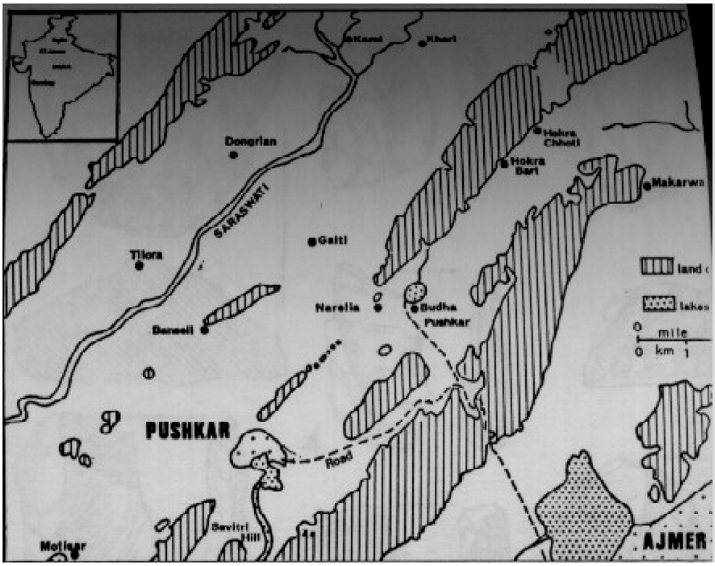
12; Possehl, G.L., 1999, Fig. 3.138). Two coursea res seen to be earliers older than the Mature Harapan. One course was thru Churu and another was through Suratgarh and Bikaner; the shift in the second course might have been caused by encroachment of sand.



Ancient extent of Marubhu_mi (Thar desert) in comparison with the present 250 mm isohyet. Line AA is the present 250 mm isohyet and may represent the current eastern margin of major active natural dunes. Line BB is the approximate limit of Aeolian depositional features. “A tentative chronology of major climate phases in the Late Quaternary: Harappan wet phase (3000-1800 BC; evidence: pollen analysis from Rajasthan salt lakes, together with archaeological evidence of thriving sites in currently dry area (Singh 1971); Pre-Harappan drier phase (7500-3000BC) evidence: pollen analysis (Singh 1971). Moist phase (8000-7500 BC)(evidence: freshwater lake sediments; start to dune weathering; extensive microlithic settlements); major dry phase (Pre-8000 BC, Upper Paleolithic)(Evidence: dunes cover lake basins, absence of human activity except at margins.”(After Goudie, A.S., Allchin, B., and Hegde, K.T.M., 1973, The former extensions of the Great Indian Sand Desert, in: *Geographical Journal*, Vol. 139, Part 2, June 1973; p. 254; Fig. 3). All along the Sarasvati Basin which is like a sponge between two perennial rivers, the Ganga and the Sindhu, the settlement sites are only a few hundred feet above the mean sea level in contrast with the Himalayan peaks approaching 9000 metres above sea level: Bhiwani (720 ft.), Hissar (700 ft.), Sirsa (650 ft.), Suratgarh (700 ft.); Fort Abbas (537 ft.). Tectonics were the principal determinants of the quantity of water which flowed through this Basin with is a doab between the Ganga and the Sindhu. Given the small nature of the relief, even minor shifts in

surface contours resulted in significant changes in the surface and subsurface drainage systems.

Sarasvati R. at Pushkar (After Allchin, B. and Goudie, 1972, Andrew, Pushkar: prehistory and climatic change in western India, in:Man, December 1972, Vol. 7, No.4).



Skanda Pura_n.a (Prabha_sa 270/30) calls the Sarasvati_ Pratiloma_ Sarasvati_ and Pra_ci_ Sarasvati_ at Prabha_sa (cf. *Indian Antiquary*, VI, p. 192) and Pus.kara respectively. Va_mana Pura_n.a (50/4) and Padma Pura_n.a (Sr.s.t.i 15/148, 18/127, 148, 203, 218) note that the Sarasvati_ river is easily accessible at all places excepting at Kuruks.etra, Prabha_sa and Pus.kara. Sarasvati_ river is said to re-start in a westerly course from the Pus.kara lake after the disappearance of the river at Vinas'ana in Kuruks.etra. The five streams including Pra_ci_ Sarasvati_ are collectively referred to as Pan~ca-srota_ Sarasvati_. (Padma P. Sr.s.t.i 18.118, 127; 33.119-120). It is notable that the Skanda Pura_n.a also describes Sarasvati_ in Prabha_sa, near Camasobheda where the river reappears, as Pan~casrota_. (Sk. Prabha_sa 202.7).

Lopa_mudra_ met and married Agastya on the sea-shore near Prabha_sa. At the same place, the Ya_davas got drunk, fought among themselves and got annihilated. The place where Kr.s.n.a gave up his mortal body is known as Dehotsarga and is

located near Prabha_sa which is also known as Soma-ti_rtha on the southern coast of Kathiawad or A_narta country. Kr.tsama_raprabha_sa is said to be situated on the bank of Sarasvati_. (Sk. P. Prabha_sa 199.1). To the north is river Bhadra_. (Sk. P. Prabha_sa 4.12-21; Na_rada P. II. 70.4-5). The forests on the banks of the river are called Ambika_vana (Va_mana Pura_n.a: 57/33) and Ka_mkyakavana (MBh. Vana 36/41). The river's confluences with three rivers are mentioned: with Gan:ga_ (gan:gobheda)(Padma Pura_n.a Svarga 32/3), Arun.a_ (Va_mana Pura_n.a 40/43-44), Manda_kini_ and Yamuna_. (Padma Pura_n.a Sr.s.t.i 11/15-16, 28/148). The Sarasvati_ course meeting the ocean at Prabha_sa is stated to have its source in the jungles of Gir in Saura_s.t.ra. (Savitri Saxena, 1995, *Geographical Survey of the Pura_n.as*, Delhi, Nag Publishers). The Sarasvati_ river is stated to reappear at three places: camasobheda, s'irobheda and na_gobhyeda. (Padma Pura_n.a 25/17-18; MBh. vana 130/3-5).

Ta_n.d.ya Bra_hman.a explains the association of Sarasvati_ with the great river through a legend: Praja_pati emitted the Word. The Word pervaded the whole (universe). It rose upwards as a continuous stream of water. (an apparent reference to the perennial nature of the river)[Ta_n.d.ya Br. 20.14.2; Caland (English tr.) *Pan~cavim.s'a Bra_hman.a*, Calcutta, 1931, p. 538]. The banks of the Sarasvati_ river in North-west India nurtured the development of the Vedic lore and learning. The river had flowed from the mountains to the sea (giribhya a_ samudra_t) and disappeared in the desert sands, as if heralding the end of the Vedic age. All groups of peoples had lived and were nourished on the banks of the Sarasvati_ river and all took the waters of the river without any distinction. (Matsya Pura_n.a CXIV.20). Together with Devika_ and Sarayu_, Sarasvati_ is described as saridvara_h. (MP CXXXIIII.24).

According to the Milindapan~ho (p. 114). Sarassati_ (Sarasvati_) issued forth from the Himavanta. (loc.cit. B.C. Law, *Geography of Early Buddhism*, 1932, Kegan Paul, Trench, Truber and Co., p. 39).

Vinas’ana as the place where Sarasvati_ river disappears is mentioned in Ta_n.d.ya Bra_hman.a (25.10.16: catus’ catva_rim.s’ada_ s’vi_na_ni sarasvatya_ vinas’ana_t plaks.ah pra_sravan.as ta_vad itah svargo lokah sarasvati_sammitena_ dhvana_ svargam lokam yanti). As’vi_na is explained as ekos’va ekena_hora_tren.a ya_vantam adhva_nam gacchati ta_va_n eka_s’vi_nah (Sa_yan.a). Atharvaveda explains that A_s’vina may exceed 5 yojanas: yad dha_vasi triyojanam pan~cayojanam a_s’vinam, tatastvam punara_yasi putra_n.a_m no asah pita_ (AV. 6.131.3): If (yat) you run three leagues, five leagues, a horseman’s day a journey, then shall you come back; you shall be father of our sons. A yojana may be 8 kros’a (1 kros’a = 2 miles). Thus, the distance between Vinas’ana and Plaks.a Prasravan.a may be estimated to be 44X16 = 704 miles. Plaks.a Prasravan.a is at a distance of 44 a_s’vina from Vinas’ana, an as’vina being the distance traveled by a consistently moving horse in one complete day and night. Plaks.a Prasravan.a is the source of the Sarasvati_ and Vinas’ana is the place of her disappearance. Maha_bha_rata places Vinas’ana at the meeting point of the regions lived in by S’u_dras and A_bhiras. Vinas’ana is mentioned as a region in the Baudha_yana S’rauta Su_tra (1.2.9): A_ryavarta lies to the east of the region where (the Sarasvati--assumed) disappears, to the west of the Black-forest, to the north of the Pa_ripa_tra (mountains), to the south of the Himalayas. (Max Mueller, *Sacred Books of the East*, Delhi, 1964, Vol. XXXII, p. 59). Vinas’ana is also mentioned in the Pan~cavim.s’a Bra_hman.a and the Jaimini_ya Upanis.ad Bra_hman.a.

Bharadwaj identifies Plaks.a Pras’ravan.a as Lavasa reserved forest (30^0 42’N; 77^0 9’E) in lowers mountains in Pacchad sub-division of district Nahan in Himachal Pradesh. (Bharadwaj, O.P., 1986, *Studies in Historical Geography of Ancient India*, Delhi, pp. 8-19).

S’ri_ Hars.a in *Nais.adhi_yacarita* (Nais.adhi_ya maha_ka_vya kavipras’asti XXII.2) refers to Sarasvati_ as a river in general**: dis’i dis’i girigra_va_nah sva_m vamantu sarasvati_m**, let the mountain-stones flow their river (sarasvati_m) in all directions. In Nais.adhi_ya maha_ka_vya (IX.51), he elaborates on Sarasvati_ both as a river and as Va_k, using the phrase,

sarasvati_rasaprava_hacakres.u bhrama_mi te bhaumi. With the blessings of S'a_rada_, another form of Sarasvati_ adored as the guardian deity in Kashmir region, the Nais.adhacarita gained literary merit.

"The image created in the R.gveda for the Sarasvati River is one of a powerful, full flowing river, not easily reconciled with the literal meaning of the name "Chain of pools"…It could be that when the composers of the Vedas first came to the Sarasvati it was a river of great magnitude…This carries with it an interesting chronological implication: the composers of the R.gveda were in the Sarasvati region prior to the drying up of the river and this could be closer to 2000 BC than it is to 1000 BC, somewhat earlier than most of the conventional chronologies for the presence of Vedic Aryans in the Punjab. The geography of the R.gveda is centered on the Punjab, and the reference, 'seven sisters', is to the 'saptasindhava' the 'seven rivers' of the region…There are a number of points that suggest that the modern dry river bed with the name Sarasvqati was also the ancient river, not the least of which is the historical continuity presumed in the nomenclature itself. In a key passage of the R.gveda, the so-called 'River Hymn' in Book X, Hymn 75, the author enumerates a series of rivers, evidently in order, beginning from the east; Ganga, Yamuna, Sarasvati, Sutlej and Ravi…the hymn alludes to the *Paravatas*, a people shown by later evidence of the Pancavim.s'a Bra_hman.a to have been in the east, a very long way from their original home, if Sarasvati means Indus. Again, the Purus, who were settled on the Sarasvati, could with great difficulty be located in the far west. Moreover, the five tribes might easily be held to be on the Sarasvati, when they were, as they seem to have been, the western neighbours of the Bharatas in Kurukshetra, and the Sarasvati could easily be regarded as the boundary of the Punjab in that sense. " (Possehl, G.L., 1999, p. 363; Macdonell, A.A., and Keith, A.B., 1912, *Vedic Index of Names and Subjects*. 2 vols. London.: Vol. II, 436).

The Great Epic enumerates the janapadas around the land of the Kurus: Pa_n~ca_la, Cedi, Matsya, S'u_rasena, Pat.accara, Das'a_rn.a, Navara_s.t.ra, Malla, S'a_lva and Yugandhara:

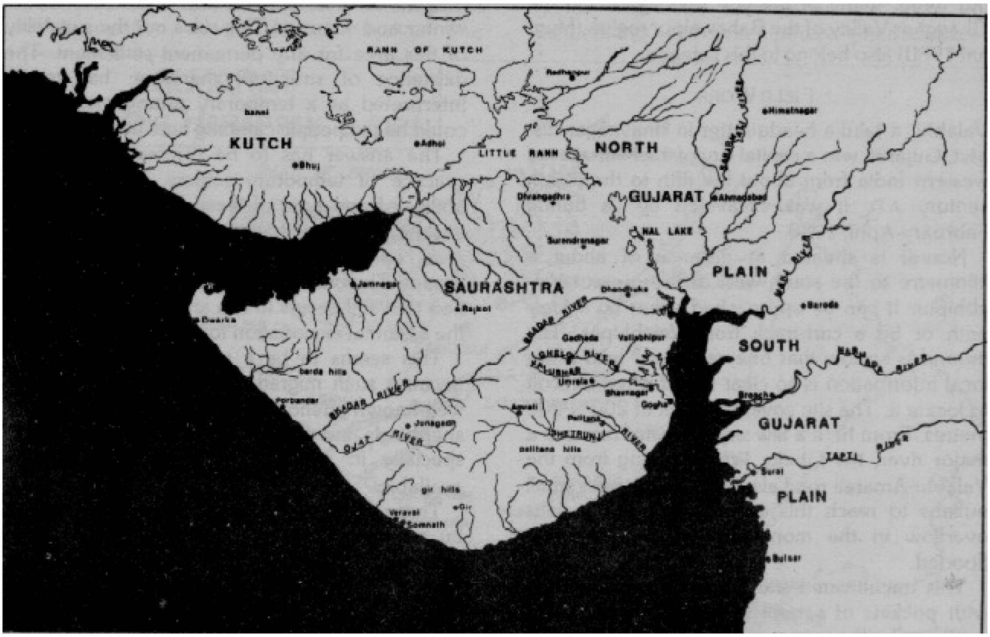
santi ramya_ janapada_h bahvanna_h paritah kuru_n
pan~ca_la_'cedimatsya_s'ca s'u_rasena_h pat.accara_h
dars'a_rn.a_ navara_s.t.ram ca malla_h s'a_lva_h yugandhara_h
(MBh. Vira_t.a 1.9)

Ka_lida_sa in Meghadu_ta describes the Sarasvati_ river as flowing in the Brahma_vartta janapada, near Kanakhala. (MD 1.52-54). The poet exhorts the cloud to drink the waters and sanctify itself: sa_rasvati_na_m antah s'uddhas tvam api bhavita_ varn.ama_tren.a kr.s.n.ah (MD 8.53). Ka_lida_sa notes that the course of the river is manifest on the surface. In an apparent reference to the two-fold division of Sanskrit and Pra_kr.ta, Sarasvati_ is seen to represent both as she praises S'iva and Pa_rvati_ through Sanskrit and Pra_kr.ta:

dvidha_ prayuktena ca van:mayena sarasvati_ tan mithunam nuna_va sam.ska_rapu_tena varam varen.yam vadhu_m sukhagra_hyanibandhanena (Kuma_ra Sambhavam 7.90).

In the course of the River Sarasvati_ near Aravalli ranges, north of Gujarat on the Arasur hills is a temple of Kotes'vara Maha_deva. Flowing past Siddhapura, the river disappears in the deserts of Kachha. (For the presence of Sarasvati_ river in and near Mount Abu: Brahma_n.d.a P. Madhya. Upo. 13.69; MBh. Vana 192.20-21; A_di 16.19-21; Padma P. Uttara 135.2-3,7).

"Roth (PW), Grassman (GW), Ludwig and Zimmer (AIL.10) are of the opinion, that in the R.gveda, Sarasvati_ is usually and originally meant a mighty stream, probably the Indus (Sarasvati_ being the sacred and Sindhu the secular name), but it occasionally designates the small stream in Madhyades'a, to which both its name and its sacred character were in later times transferred. Max Muller believes it to be identical with this small river Sarasvati_, which with the Dr.s.advati_ formed the boundaries of the sacred region Brahma_varta and which loses itself in the sands of the



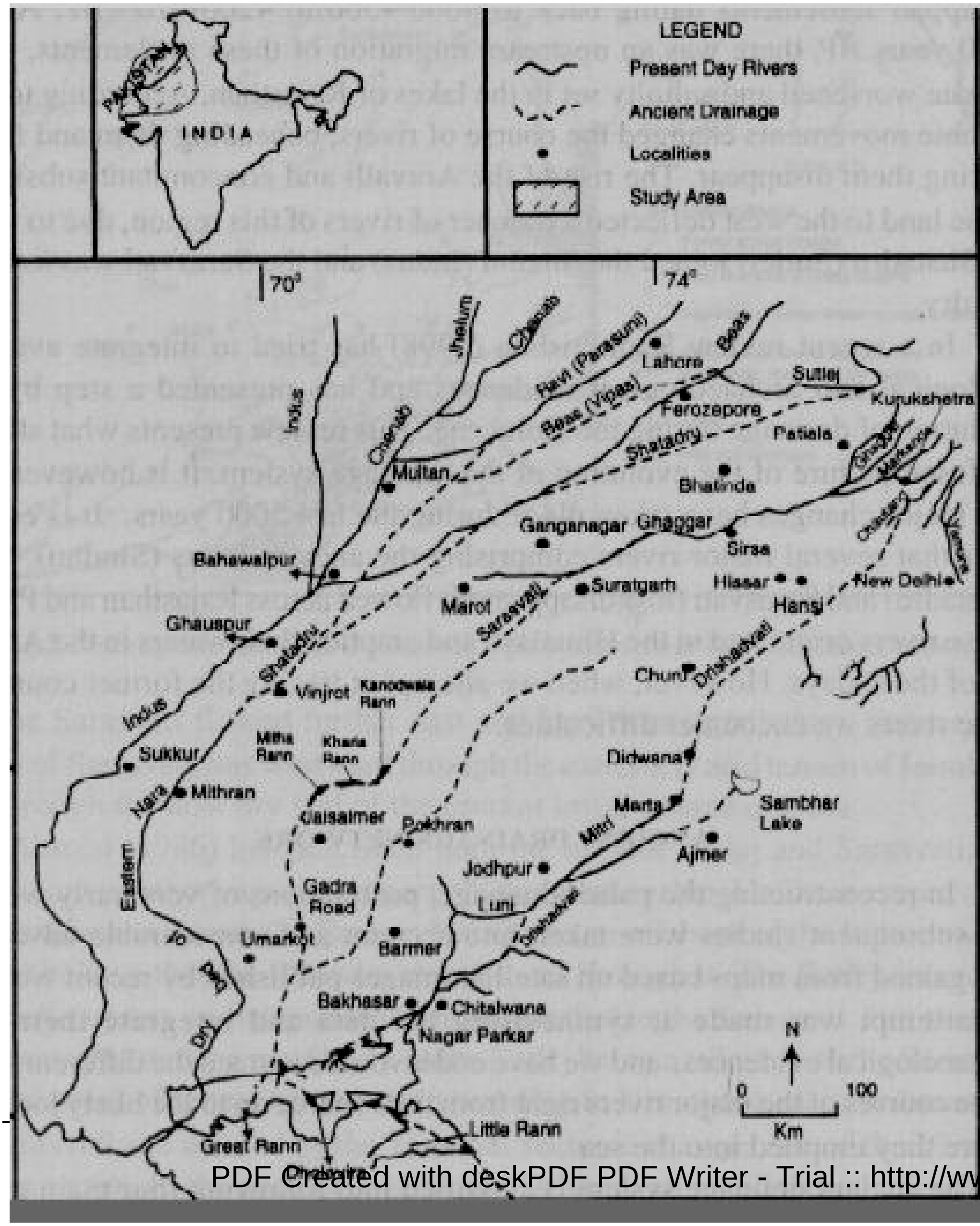
desert, but in Vedic times reached the sea. According to Oldham, a survey of ancient river beds affords evidence, that the Sarasvati_ was originally a tributary of the Sutudri_ (the modern Sutlej), and that when the latter left its old bed and joined the Vipa_s', the Sarasvati_ continued to flow in the old bed of Sutudri_." (A.A.Macdonell, ***The Vedic Mythology***, Varanasi, Indological Book House, 1963, p. 87).

Stein identified Gan:gobheda with the shrine of Bheda_ devi at the village Hal-Mogulpur in Shrikru close to the “Kooshopoora”. The village shrine is in a small enclosure round a magnificent old Chinar tree. There is a lake on the summit of the Bheda_ hill and a place named Buda_bra_r in Kashmiri and Bijabra_ri in Pahari.

“The Gan:gobheda Ma_ha_tmya relates how the sage Pulastya performed long penances in the Satides’a and made the Gan:ga_ gush forth near him from Himavat mountain for the purpose of his sacrifice. When Pulastya decided to discharge the river after finishing his worship, Sarasvati_ stopped him from doing so and announced that a ti_rtha names Gan:gobheda would arise at the place from where the river issued. On the top of a hill where the level ground extends for ten Dhanus, a great pond would be formed and its eastern foot a stream called Abhaya_ would issue. A boon to the sage was granted for which he asked that the river may rest for ever by his side. The boon was granted and the Gan:gobhedati_rtha was created. With a desire to see the goddess Sarasvati_ the sage performed severe penances. Having been worshipped by him, Sarasvati_ explains her sixfold nature to him. With reference to this, the sage gave her the name of Bheda_ and worshipped her as Ham.sava_gi_s’vari_ Bheda_. Since then the goddess received worship at Gan:gobheda ti_rtha.” . (Savitri Saxena, 1995, *Geographical Survey of the Pura_n.as*, Delhi, Nag Publishers, pp.732-733). The Ni_lamata gives a brief reference to the goddess Bheda_ at Gan:gobheda (Ni_la. V. 1312; 1039)…it notes that the shrine of Bheda_ was made by Pulastya.

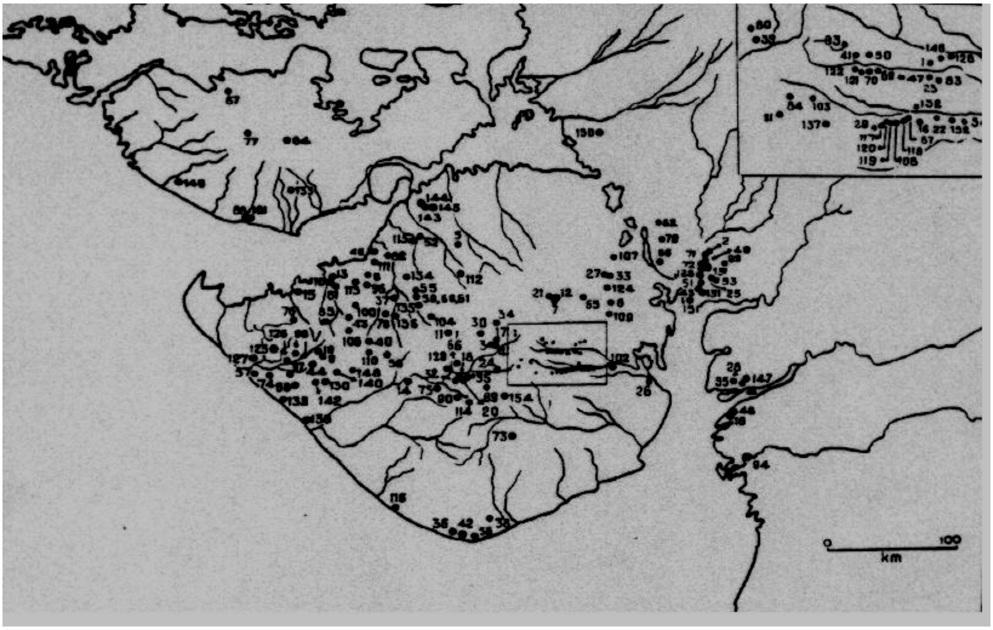
The reference to Pra_ci_ Sarasvati_ in many ancient texts assume that there was a western Sarasvati_ in relation to the Sarasvati_ river courses and tributaries identified in the Kuruks.etra, Kuruja_n:gala regions. This western Sarasvati_ is simply the mighty river which flows after confluence with Ghaggar beyond Kalibangan, Suratgarh and Anupgarh towards the Bahawalpur province and beyond through Sind into the Rann of Kutch and throught the Nal sarovar towards Prabha_sa flowing beyond Lothal and Rojdi, to join the ocean. The western Sarasvati_ is the saptathi_ sindhuma_ta_ or seven-sistered river referred to in the R.gveda (RV. 7.36.6). This is an indication that the mighty Sarasvati_ river had

seven tributary rivers. In another reference, Sarasvati_ is called the seventh (RV. 7.36.6); the other six are the five Punjab rivers which are the tributaries of Sarasvati_ river (VS 34.11) and Sindhu. The description of Sarasvati_ in these terms is clearly a reference to the Ghaggar-Hakra-Nara river course which ahd been noted even at the time of the advent of the Arabs in Sind. (cf. Raverty, Mihran of Sind and its Tributaries, *JASOB*, Vol. LXI, Pt. I, Extra No. 1892, pp. 471-3 and 475 f.; *JASOB*, Vol. LXI, Pt. I, No. III-1892, pp. 155-297).


LEGEND
Present Day Rivers
Ancient Drainage
Localities
Study Area
INDIA
PAKISTAN
70°
74°
Indus
Jhelum
Chenab
Ravi (Parasuni)
Beas (Vipas)
Beas
Sutlej
Shatadru
Lahore
Ferozepore
Kurukshetra
Patiala
Bhatinda
Multan
Ganganagar
Ghaggar
Sirsa
Bahawalpur
Marot
Suratgarh
Hissar
Hansi
New Delhi
Ghauspur
Sarasvati
Drishadvati
Chunu
Vinjrot
Kanodwala Rann
Mitha Rann
Kharia Rann
Sukkur
Nara
Mithran
Didwana
Jaisalmer
Pokhran
Marta
Sambhar Lake
Ajmer
Mitri
Jodhpur
Eastern
Gadra Road
Luni
Umarkot
Barmer
Bakhasar
Chitalwana
Nagar Parkar
N
0
100
Km
Little Rann
Great Rann

"...the Indian paleontologist M.R. Shani noticed silt deposits perched many feet above the level of the Indus plain near the city of Hyderabad in what is now West Pakistan. This and other evidence suggested to him that the area's ancient floods had not been mere river overflows but events on a far larger scale. Major tectonic upheavals, Sahni proposed, might have blocked the Indus River from time to time; each such stoppage would have caused the gradual formation of a huge upstream lake that might then have persisted for decades... Raikes's preliminary research not only suggests that the dam-and-lake hypothesis proposed 25 years ago by Sahni is tenable but also singles out an area near Sehwan, some 90 miles downstream from Mohenjo-daro, as the most probable area of tectonic disturbance affecting the city... Both the multiple layers of silt at Mohenjo-daro and the evidence of multilevel reconstruction suggest that the city was flooded in this prolonged and damaging fashion no less than five times and perhaps more... Could such a series of natural catastrophes, rathern than the Aryan invasion, have brought about the collapse of the Harappan civilization?" ((From: George F. Dales, 1972, The decline of Harappans, in: Scientific American readings: *Old world archaeology: foundations of civilization*, San Francisco, WH Freeman and Company, p. 160). Dholavira (Kotda), Rann of Kutch in relation to the ancient Sarasvati Delta (After Sridhar et al., Late Quaternary Drainage Disruption in Northwestern India, in: *Vedic Sarasvati*, 1999, Fig. 4, p. 196).

The Rann of Kutch and the Little Rann of Kutch are not deserts. They are stretches of sand leveled to an asphalt-like consistency by salty efflorescence and brine. The area remains waterlogged during monsoons and until the onset of winter. The area is dotted with low hills. The sandstones of the area constitute the veritable storehouses of underground water.



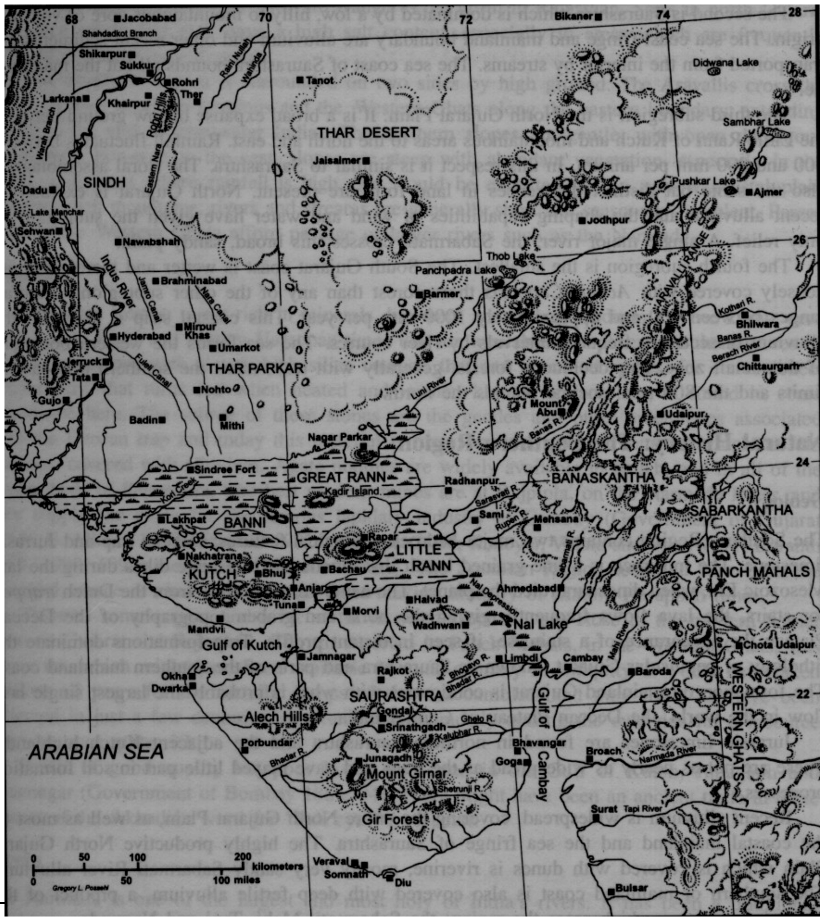
Map of Gujarat with the river systems and Nal lakes linking the Little Rann of Kutch with Lothal, which was linked with Prabhas Patan (Somnath) through Rojdi and Rangapura; there should have been a course of the Sarasvati River crossing Vallabhipur and Amreli; and Rangpur and Rojdi. (Map is drawn after R.N. Mehta, 1984, Fig. 26.1).. Nesadi, near Valabhi was excavated (Bhavnagar district, Gujarat); Valabhi was a capital city of Maitrakas from ca. 5th to 8th cent. A.D.

Prabhas Patan (Somnath); discovered near a warehouse is a stone steal with two stags engraved deeply (After M.K. Dhavalikar, 1984, Pl. 101). Early Prabhas culture was dated to ca. 1990 BC.

Gujarat; Late Harappan settlements, mainly short-term camps, in the black-cotton soil of Saurashtra (152 sites as compared with 20 in the Mature Harappan period). Gujarat; distribution of Mature Harappansettlements; Bhagatrav; 2. Desalpur; 3. Jhangar; 4. Kesari; 5. Khari ka Khanda; . Kotada Bhadli-II; 7. Kotada Bhadli-III; 8. Kotada; 9. Kotadi (Dholavira); 10. Kotara (Juni-Kuvan); 11. Koth; 12. Lakhapur; 13. Lothal (3740 BP); 14. Nagwada-I (370 BP); 15. Nageswar; 16. Pabumath; 17. Pirwada (Khetar); 18. Rangpur; 19. Samagogha; 20. Surkotada (3645 BP). (After G.L. Possehl, 2000, Fig. 3.133, p. 327). Eastern Nara, Great Rann,

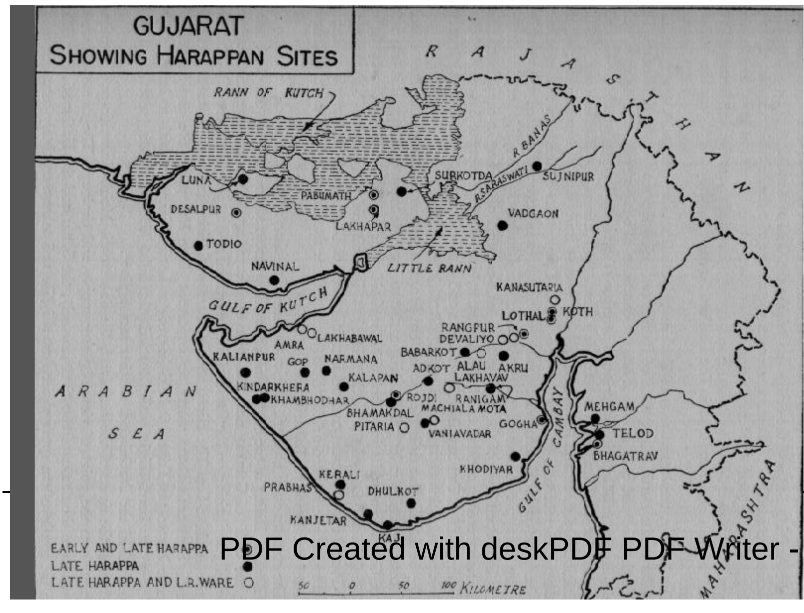


Banni, Little Rann, Sarashtra around the Gulf of Kutch and Gulf of Khambat (Cambay). The area encompassed is ca. 150,000 sq.km. including the salty marsh of Kutch, sandy alluvium of north Gujarat, forests of western ghats, bounded on the south and west by the sea, onj the north by Sindh qand m ountains and on the east by mountains. The entire north Gujarat plain, coastal mainland and the fringes of Saurashtra along the Arabian sea, is covered with alluvium, mostly brought in by the Sarasvati River. The region has reserves of agates (translucent stones with a very high silica content), chalcedony which turns red when heated (called carnelian) serving the lapidaries at Khambat (Cambay). Panch Mahals in the western ghats have placer tin.



"A review of the regional

archaeological assemblages indicates a cultural continuity, without stratigraphic break, demonstrating that the Harappan culture did not end abruptly, as was thought earlier (Possehl, Gregory L., Indus Valley Civilization in Saurashtra, New Delhi). Nevertheless, there was a change during the second millennium BC that led to the abandonment of cities like Mohenjodaro, Harappa, Lothal and many other Harappan sites. In Gujarat, the settlements of the Mature Harappan phase are few and far between compared to the large number of settlements of later phases... the settlements at Nageswar, Lothal and the sites in Kutch amply demonstrate that the settlements were developed mainly for trade and access to raw materials or to facilitate administration rathern than simply subsistence activities. The expansionist tendency on the part of Harappans towards resource areas is further substantiated by the discovery of Shortugai in the lapis lazuli producing region of northern Afghanistan (Frankfort, H.P. and M.H. Pottier, 1978, Sondage preliminaire sur l'establishment protohistorique Harappeen et Post-Harappeen de Shortagai, *Arts Asiatique*, 34: pp. 28-85)." (Kuldeep K. Bhan, Late Harappan Settlements of Western India, with specific reference to Gujarat, pp. 219-234 in: *Wisconsin Archaeological Reports* 2, 1989).



Gujarat: Harappan Sites (After S.R.Rao, Lothal, Vol. I, 1979, Fig. 3).

The mighty River Sarasvati joined the sea

Possehl (1998) raises a question: Did Sarasvati ever flow to the sea?

"There is no river bed connection between the termination of the Sarasvati in an inland delta near Fort Derawar, and the Eastern Nara. This delta documents the petering out of the river. It also explains the large number of sites, which came to the fertile delta to use it as farm land and pasture. There are two palaeochannels to the north of the Rohri hills (Raini and Wahinda) but both are far too small to be the remains of a Sarasvati channel... See also Lambrick, H. T. 1964 *Sind: A general introduction*. History of Sind Series, Vol.1.Hyderabad (Pakistan):Sindhi Adabi Board: 274 pp. [Lambrick was an irrigation officer and an archaeologist. He ha ssearched on the ground for the connection between Fort Derawar and the Eastern Nara and never fhoud it. He also identified the inland delta areound Fort Derawar.]" (Gregory L. Possehl, April 1999, personal communication).

Raini and Wahinda provide contrasting features: Raini is a deep water course while Wahinda is wide and flat. Since both Raini and Wahinda flow in a hollow between the Sindhu and the Thar Deseart, there is reason to surmise that these courses of Raini and Wahinda could be seen to be extensions of the Sarasvati River in Sindh. "The Raini on the whole deserves its title 'Nullah', for it is a deep water course, not more than forty yards wide in places, with steep banks some fifteen or twenty feet high. The country on either side—hard alluvium with sand hills—slopes down to it perceptibly from either side. The bed of the Wahinda on the other hand is wide and flat, and in many places difficult to recognize among the drift sand. One has the impression that great floods occasionally rolled down the Wahinda, filling up all the open places between the sand hills for miles, and not perhaps progressing to a

very great distance southward; but that more often the spill water kept to the Raini—far exceeding its capacity for a while, but flowing down the steeper declivity, and scouring out the central nullah." (Lambrick, 1964: 31-2).

Recent studies in quaternary tectonism and geomorphology (1999) have addressed this question posed by Possehl. These are presented in the following sections, in the context of many studies reported and hypotheses built over the last 140 years.

Lambrick's (1964) observations have been fully dealt with by Wilhelmy (1969). Some additional answers are provided by other workers, including the findings reported in 1999 of the Earth Scientists' group discussions held in University of Baroda (*Vedic Sarasvati*, published as a Geological Society of India Monograph No. 42).

Apart from the hundreds of sites found in Bahawalpur province (Cholistan), the sites of Naru-waro-Daro, Kotdiji, Nandowari, Chanhudaro, Gharo Bhiro (Nuhata), Pabumath were on the banks of the Sarasvati (Hakra-Nara-Mihran palaeo-channels), i.e. left bank of Sindhu river. Towards the Little Rann of Kutch, the sites on islands in the Greater Rann were: Kotada (Dholavira), Surkotada, Desalpur, Khirsara (Netra). Down at the Gulf of Khambat (beyond the Nal sarovar) were the sites of Lothal and Rangpur en route (westwards) to Rojdi, Machiala, Prabhas Patan.

More issues are also raised including those which require further research and field work. Several grey areas and gaps in knowledge still exist and need to be unraveled further.

Sarasvati is described as follows in R.gveda hymns:

> **eka_cetat sarasvati_ nadi_na_m s'uciryati_ giribhya a_ samudra_t ra_yas'etanti bhuvanasyabhu_re ghritampayo duduhe nahus.a_ya (RV. 7.95.2)**

Pure in her course from mountains to the ocean Sarasvati river bestows for Nahusha nutritious milk and butter.

a_ yatsa_kam yas'aso va_vas'a_nah sarasvati_ saptathi_ sindhuma_ta_ ya_h sus.vayanta sudugha_h sudha_ra_ abhisvena payasa_ pipya_na_h (RV. 7.36.6)

May the glorious seventh (stream) Sarasvati, the mother of the Sindh and other (rivers) charged with copious volume of water, flow vigorously; come together, gifting abundant food and milk.

[There is a possible interpretation that Sarasvati had seven tributaries and that the Indus and her 5 tributaries: Sindhu (Indus), Sutudri (Sutlej), Parushni (Ravi), Asikni (Chenab), Vitasta (Jhelum), Vitasa (Beas) were also the tributaries of Sarasvati. RV. 3.24.4 indicates the possibility that Drishadvati and Apaya were also tributaries of Sarasvati].

Viewed as an allegory, RV 1.32.10-13; 1.54.10; 2.30.3 hymns are explained as follows: "It looks as though the Vedic sages experienced the life and death of the river system which, they loved most, due to long spell of glaciation (ice age) and warming. They expressed it in terms of periodic war between Indra and Vritra. The frozen rivers (Glaciers) occupying zig-zag passages were visualised as the great serpent 'Vritra' who withheld water and the Sun god 'Indra' who released the water. The tussle between this natural phenomen of freezing and thawing of water was described as a war between the two...Two important tributaries, the Sutlej and the Yamuna; Sutlej (Sutudri) rises near Manasarovar whereas Yamuna from the western slope of Bandarpunch in the Jamnotri glacier; both being snow-fed perennial rivers had enough water to contribute...". (D.S. Chauhan, 1999; loc. cit. Murthy, 1985; Wakankar, 1985; Hillebrandt, 1990).

da_spatni_rahigopa_ atis.tannirudha_ a_pah pan.ineva ga_vah

apa_m bilamapihitam yadasi_d vritram jaghanva_m apatadvava_r (RV. 1.32.11)

Mastered by the enemy, the waters held back like cattle restrained by a trader (Pan.i). Indra crushed the Vritra and broke open the withholding outlet of the river.

Evidence from Mahabharata

sarasvati_ pun.ya vaha_... samudraga_ maha_ vega_ (MBh. 3.88.2)

Holy flow of the Sarasvati joins the sea impetuously.

The Great Epic has a treasure of geographical information about the courses of the River Sarasvati and also the pun.ya ti_rthas and a_shramas of r.s.is located on the banks of the river. This comprehensive evidence will be presented in detail in a separate section, authenticating the Maha_bha_rata as the sheet anchor of the textual evidence for the ancient history of Bharat.

Remote Sensing to Understand Palaeo Drainage Evolution

Many ancient courses of River Sarasvati emanated from the Himalayas and joined the Sindu sa_gara (Arabian Sea). The evolutionary history of the river has to be studied in the context of the evolutionary history of the drainage system of NW Bharat.

Sindhu (Indus) river has a very wide flood plain (upto 100-120 km) in the east and southeast. There is indication of a preferential migration of the river towards northwest in the northern part and towards west in the central southern part (Rajawat and Narain, 1996). The course of the river Markanda/Sarasvati/Ghaggar could be traced in the south of Sutlej upto to Fort Abbas in Pakistan. Further continuity and the linkage of this river to the Indus is, however, missing. Faint trace

of the river amuna in the south of Sarasvati/Ghaggar/Markanda seems to be main course of the river Sarasvati. To the north of Delhi, the river Yamuna and Sarasvati migrated in opposite directions i.e. eastward and westward, respectively. Shifting of Yamuna eastward has rendered the Sarasvati/Ghaggar as an underfit river. This may be the initiation of drying up of Sarasvati/Ghaggar rive which subsequently became accentuated due to prevailing dry climate. It is also possible that during the late Quaternary, due to neotectonic movements, the Delhi-Hardwar ridge might have got uplifted causing deflection of Yamuna river to the east.

It is noted that the Yamuna was a tributary of the Sarasvati River and took an easterly course to join with the Ganga at Prayag. When such a migration occurred, the river was named the Yamuna. "It becomes fairly clear that the Jamuna was at one time a contributor, by way of the ancient bed of the Chitang (Chautang), itself a mile wide. The low watershed between the Indus-Hakra and the Ganges basins at the present time runs between the Chitang and the Jamuna; but the latter, an 'alluvial' river from the High Himalaya, formerly ran along this ridge, and overspilled indifferently to either hand, later slipping off the ridge to the eastward. The Chitang unites with the Ghaggar or Hakra at Bhatwar." (Lambrick, H.T., 1964, *Sind: A general introduction*. History of Sind Series, Vol.1. Hyderabad (Pakistan): Sindhi Adabi Board: 30).

Doubts are cast on the dates when the migration of Yamuna occurred and also on the links with Sarasvati through the Chautang river course. One view is that the migration could be dated to the Pleistocene or the Early Holocene, based on the evidence of well developed terraces in the upper Yamuna. "Yamuna-like rivers, rising from the Himalaya, stopped flowing in the study area well before the Protohistoric period. This assessment is based on the lack of Yamuna type alluvium at a depth less than 8 m below the present day floodplain and especially by its absence below the Protohistoric sites. Alluvium deposited during the early Holocene, just below the Protohistoric period, was similar to the Ghaggar one." (Courty, M.A., 1989, Integration of sediment and soil information in the reconstruction of protohistoric and historic landscapes of the Ghaggar Plain, north-

west India. In, Karen Frifelt and Per Sorensen, eds., *South Asian Archaeology 1985*. Scandinavian Institute of Asian Studies, Occasional papers No. 4: 255-59).

Doubts are also expressed about the Sutlej having joined the Sarasvati by comparing the soil types of the Sotar (Hakra) which are fine, fertile alluvium and hence, different from the sandy silt of Sutlej: “The soil (of Sotar) is all rich alluvial clay, such as is now being annually deposited in the depressions which are specimens of these numerous pools which have given the Sarasvati its name, ‘the river of Pools’; and there seems little doubt that the same action as now goes on, has been going on for centuries, and the numerous mountain torrents of the Indo-Ganges watershed, fed, not by the snows but by the rainfall of the Sub-Himalayan ranges, wandering over the prairie in many shallow channels, joined in the Sotra or Hakra valley and formed a considerable stream, at first perhaps perennial but afterwards becoming absorbed after a gradually shorterning course, as the rainfall decreased over the lower Himalayan slopes, and as the spread of irrigation in the submountain tract intercepted more and more of the annual floods…” (Wilson 1884, quoted in Oldham, R.D., 1887: 334). Oldham argues that alluvial processes change over time and notes the presence of Naiwal branches of Sutlej in Bhatinda and neighbouring districts linking with Sarasvati. This observation is substantiated by the finds of three large Harappan sites: Lakhmirwala, Hasanpur Two and Curnikalan One. (Joshi, J.P., 1986, Settlement patterns in the third, second and first millennia in India—with special reference to recent discoveries in Punjab. In, K.C. Varma et al eds., *Rtambhara: Studies in Indology*. Ghaziabad: Society for Indic Studies: 134-39).

This observation is elaborated further by Lambrick: “On the opposite side, that is the right bank, there are traces of flood channels from old beds of the Sutlej, or it may sometimes have been the entire Sutlej River, joining the Hakra in three widely separated places. The furthest upstream and least distinct of these seems to have come in at Bhatnir, some twenty-five miles above the junction of the Chitang. Next in order, an ancient winding bed of the Sutlej, unites with the Hakra at Walhar (Fort Abbas), just within the border of Bahawalpur. This appears to derive from an

old course of the Sutlej which flowed past Bhatinda and Malot, and its general alignment has been followed by the Hakra Branch Canal. The third of these connecting channels runs down from about 20 miles ENE of Bahawalpur City, and meets the Hakra near Kudwala. Its general direction has been followed by another irrigation canal, The Desert Branch; but we have been told that it was previously 'a large dry channel called Vahind, a feeder of the Sankara' (Buckley, R.B., 1893, *Irrigation Works in India and Egypt*. London: E. & S.N. Spoon.: 156). Thirty miles or so below this junction, in the neighbourhood of Derawal, the single wide bed of the Hakra seems to develop into a sort of delta of smaller channels." (Lambrick, 1964: 30-1).

IRS P3 Indian Remote Sensing Satellite Mosaic: Sarasvati/Markanda/Ghaggar rivers; Indus River System: Jhelum, Chenab, Ravi, Beas Source: WiFS (Wide Field Sensor)data by exposing red (0.62-0.69 um) through green and near infra red (0.77-0.86 um) through red guns covering the Indus river system from the Himalayas to the Arabian Sea; in: D.P.Rao, Role of Remote Sensing in Understanding of Palaeodrainage Evolution, *Memoir Geol. Soc. of India. No. 42*, 199: 237-244.

Palaeo-Delta Complex of Vedic Sarasvati and other Ancient Rivers of Northwestern India

ABSTRACT

A few thousand years back several mighty rivers drained the northwestern part of the Indian subcontinent and these now stand disrupted, partly destroyed and preserved only as poor relicts making up the present day drainage. Of the four major rivers viz. Sindhu (Indus), Shatadru (Sutlej), Sarasvati and Drishadvati, the

last two have been obliterated. The descriptions of these rivers mentioned in Vedic and Post-Vedic literature are to a large extent intertwined with mythological events due to which it is rather difficult to precisely recognise the present day sites of these ancient channels.

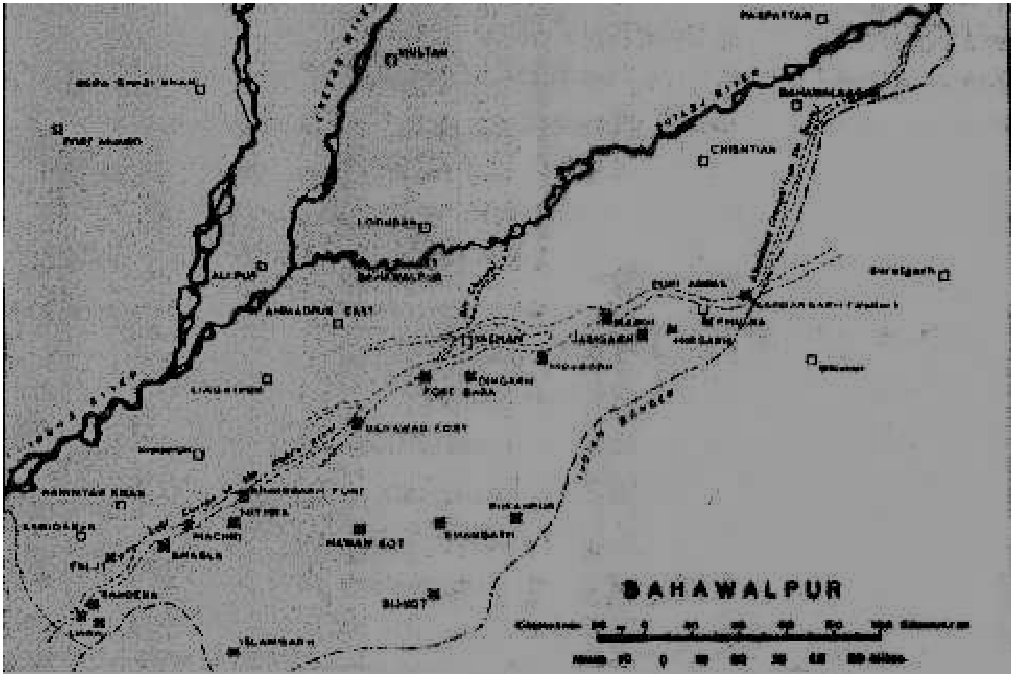
Synthesizing the descriptions available of the early workers, who have described the geography of the Vedic period, with the later works an endeavour has been made to identify the various ancient rivers and to describe their courses, right from their origin to the likely locations where they met the sea. All these rivers flowed into a gulf of the then existing Arabian Sea. Their mouths came quite close to one another in the northern part of the Great Rann of Kutchwhich today represents the delta complex comprising deposits of these ancient rivers.

Late Quaternary tectonism in combination with the sudden increase of aridity related aeolian activitiy disrupted and obliterated the courses of these rivers. As a result, today there exists only the fragmentary relicts of the disrupted/destroyed rivers, whose lower courses lie buried beneath the sands of the Thar desert. On the basis of archaeological evidences, studies on geological and climatic changes and recent geo-chronological information, tectonic changes have been envisaged which began around 3700 B.P. and continued righ up to the 11th/13th century.

"...Though this topic has engaged the attention of several workers during the last 150 years a clear picture has not emerged. Studies have been carried out in compartments and there has hardly been any attempt to integrate all the available information and present a full scale detailed regional picture of the ancient rivers and their courses... Today the channels of these rivers lie partly buried beneath the Thar desert sands, but according to our perceptions, the drainage disruption was not

due to choking of river courses by sand. The main cause was tectonism. Uplifts and subsidences of large tracts along structural lineaments brought about the destruction of Sarasvati and Drishadvati and changes in the course of Shatadru and Yamuna.

"...To C.F. Oldham (1874 and 1893) and R.D. Oldham (1886), two officers of the Geological Survey of India goes the credit of focussing attention on palaeo-drainage of northwestern India. C.F. Oldham as early as 1874 had given a preliminary account of the traces of a lost river in the Thar deser (Great Indian Desert). Subsequently, in 1893, he came out with a detailed paper, wherein he described the Rigvedic Sarasvati and speculated on the circumstances leading to its

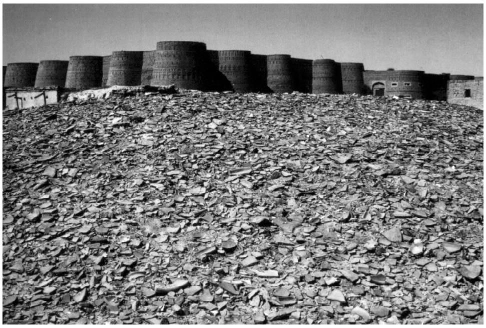


Ancient courses of the Sarasvati River in Bahawalpur province (Cholistan desert), after Mughal 1997

subsequent disappearance... C.F. Oldham (1893) reported the existence of a dry bed course of a great river within the sands, which once flowed across the desert to the sea. He has referred to this channel as Hakra which flowed through Bikaner and Bahawalpur into the Rann of Kach. This rive according to him represented the former course of Shatadu (Sulej) and the Sarasvati was a major tributary joining it. At some point of time when he Sutlej changed its course westwards to meet Beas and finally the Indus, its abandoned eastern arm viz., Hakra was left as a deserted channel...

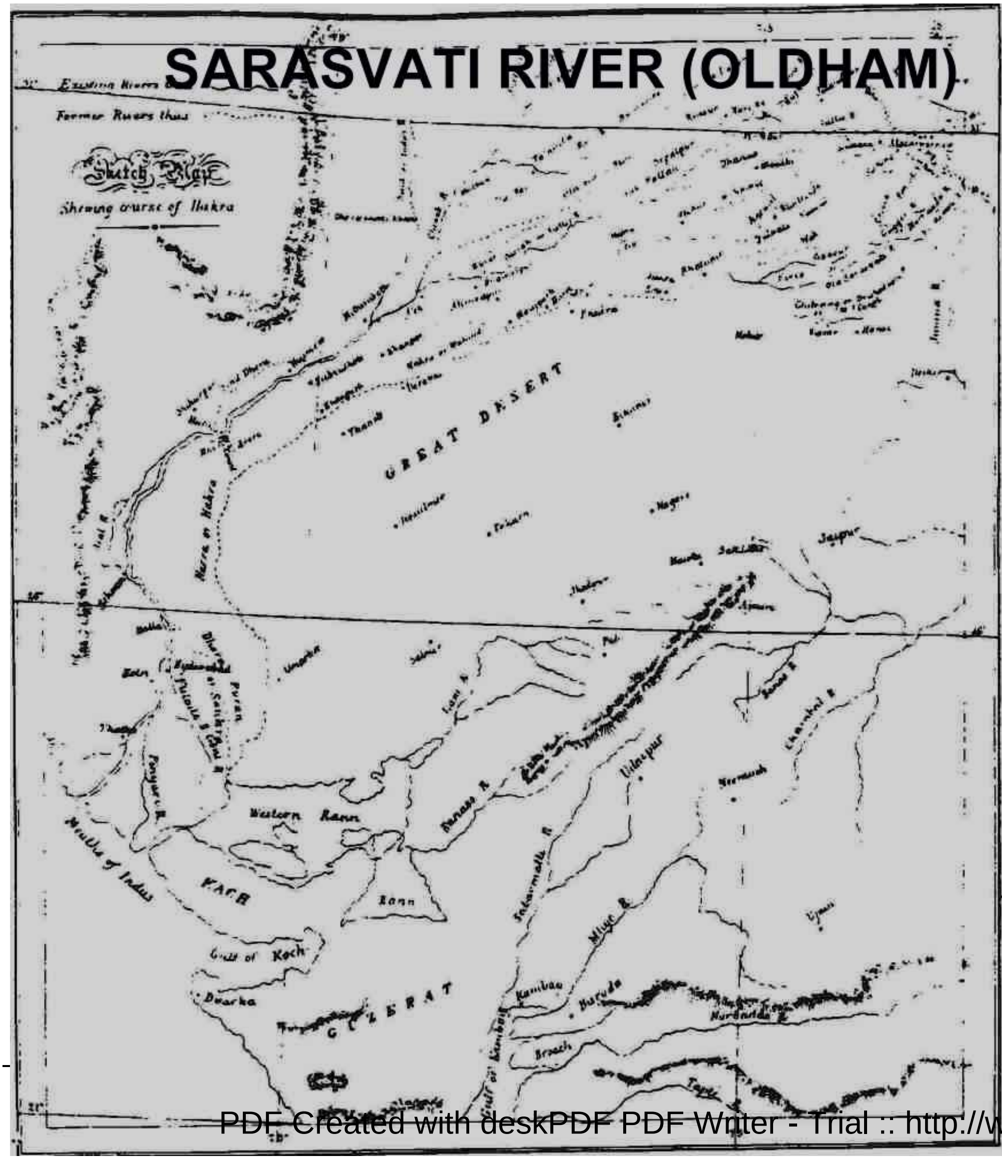
Palaeo-channel of Hakra, in Cholistan, as an extention of Sarasvati flowing from Thar Desert, After Mughal 1997.

"According to R.D. Oldham (1886), it was Sutlej (Shatadru) not Sarasvati, whose lower course has been referred to in literature as Hakra, Sankra, Wandan, Wahind and Nara. Ruling out that the Eastern Nara was a deserted bed of the Indus, he stated that its upper portion comprised Hakra, a channel along which Shatadru once flowed. In his map, an ancient channel continuous from Nara can be traced with the dry bed of Hakra, following through Bahawalpur and Bikaner. According to this worker, Hakra was thus the old bed of the Sutlej, which joined up with the Nara till the 11th century. Prior to the 11th century it did not join the Beas as it does today, but instead pursued an independent course to the sea...



Derawar, Bahawalpur province; pile of potsherds and modern pottery kiln amidst habitation area close to the Derawar fort; these are analogous to the pottery firing sites of the Harappan period. (After Mughal, 1997, Pl. 28).
(Dry bed of Wandan, Wahind, Sotra, Hakra or Sankra; and ancient drainage of western Indian sub-continent, After Oldham 1886).

Subsequently (after Marshall, 1931) another archaeologist Stein (1942), linked all the Harappan sites discovered along the old palaeochannel of Ghaggar to



the ancient Sarasvati; by implication the palaeochannels of Ghaggar and Hakra, according to him, represented the ancient Sarasvati...

Aloys Arthur Michel, *The Indus Rivers: A study of the effects of partition*, 1967, Yale University Press, New Haven.

"… the uplift of the Himalayas, including the Siwaliks, is apparently still continuing, offset by rapid erosion of course, and earthquakes are by no means uncommon as a result... (p.25)... there would seem to be little doubt that the present, almost imperceptible watershed between the Ganges and Indus drainage is very recent in origin. Here the key seems to lie in the shifting or migration of stream beds across the alluvium of the plains, and key role to have been played by the Jumna and a former stream (possibly the legendary Sarasvati) the course of which is now marked by the bed known as the Ghaggar in the Indian Punjab and Rajasthan, and as the Hakra in Pakistan Bahawalpur, that parallels the Sutlej towards the Indus. The enormous amounts of detritus brought down by the Punjab rivers and the present affluents of the Ganges are more than sufficient to explain stream blockage and shifting without invoking tectonic forces, and capture of one stream by another is well-attested. The Beas, for example, was captured by Sutlej at the end of the eighteenth century. Its old course near Harike to the Chenab above Panjnad is well marked in the landscape of the southern Pakistan Punjab, with the town of Kasur and a series of villages still lining its 'banks'.

“The Ghaggar, which is used in part by modern canals and which has begun to flow again as water tables have risen, may very well represent the former course of such a truncated river. Spate suggests that it could have been fed either by the Sutlej, itself occupying a different channel, or by the Jumna. If it was the Jumna, then the Jumna clearly has been captured by the Ganges... in the broadest sense the Indus Plains may be regarded as one vast and fairly homogeneous aquifer, a sort of vast sponge, capable of absorbing runoff from the foothills as well as rainfall and seepage from the rivers and canals that cross them, and of transmitting this subterranean flow downslope to the Arabian Sea. (Notes: cf. the legends regarding

the disappearance of Sarasvati underground-antah salila_ sarasvati_!) The water table or top level of this vast reservoir varies with distance from the foothills and from the rivers and canal, as well as with local alterations in the nature of the matrix, and it varies from season to season and year to year.

"Recent investigations in the Pakistan Punjab have been sufficiently detailed to allow preparation of contour maps showing depth to water table, and comparisons

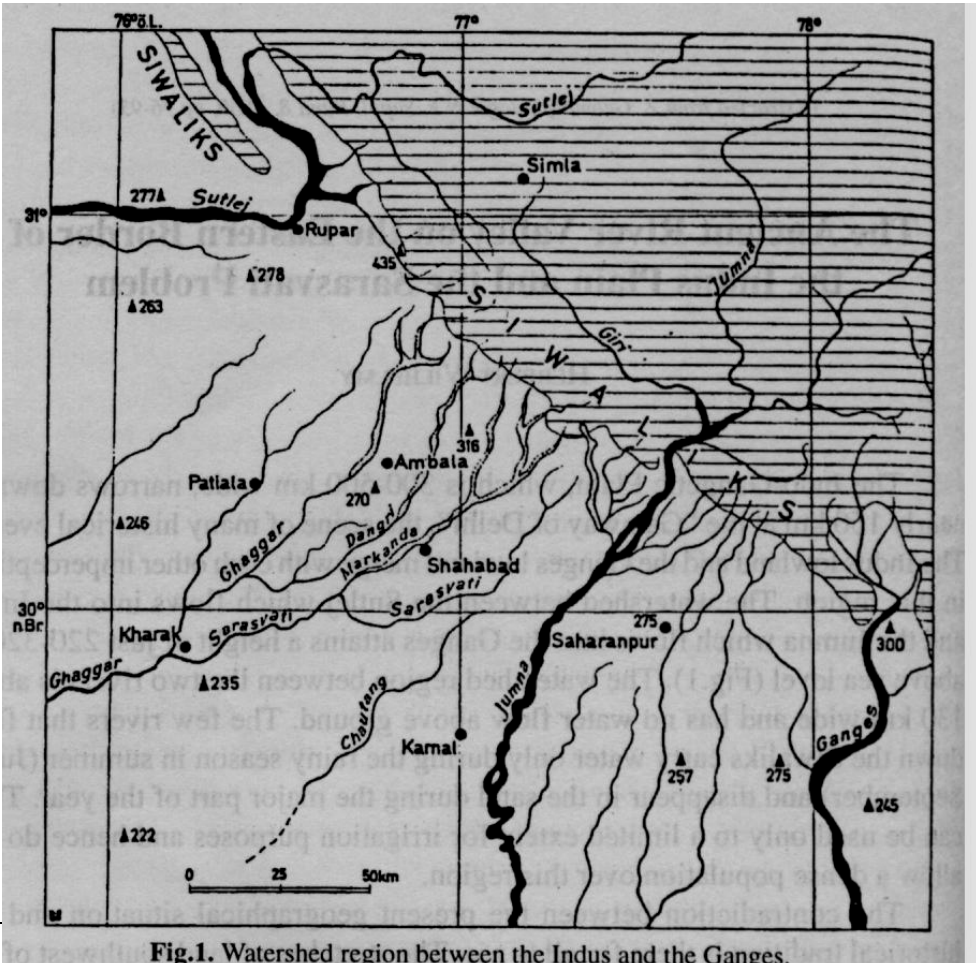
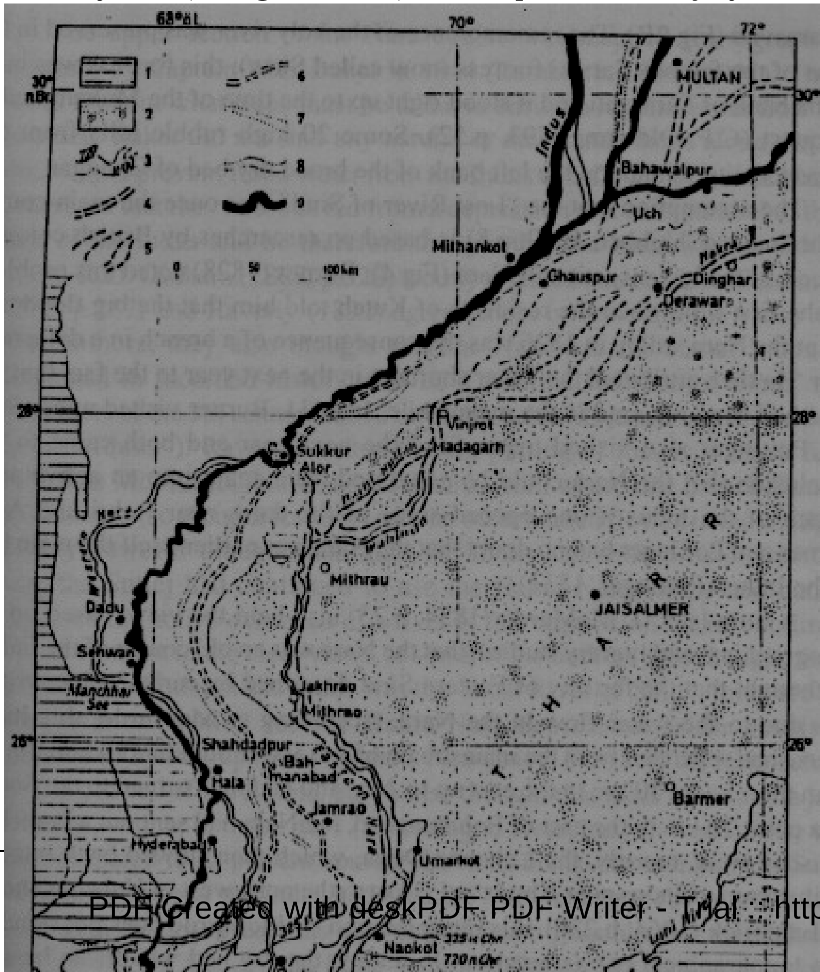


Fig.1. Watershed region between the Indus and the Ganges.

with older data from wells indicate its general rise since irrigation was introduced (cf. Greenman et al, Maps 11, 12, 16-20). Variations in the salt content of the groundwater have also been charter over much of Punjab... The groundwater reservoir apparently represents at least ten times the annual runoff of the Indus Rivers, and in many areas offers an additional source of irrigation water when tapped by tubewells. The control of the water-table level by means of pumping from wells or by drains is also essential to the success of the surface-water irrigation, for in many areas the salt-carrying groundwater has risen perilously close to the surface (pp. 27-28)(Note: see the situation hu_daka-in Sarasvati Ghat and Brahma yoni near Vasis.t.a_s'ramam where the river becomes pra_ci_va_hini_; sarasvati is so named in the revenue maps of Haryana and also in Bha_rat Bhu_racana_, Survey of India maps.)

Wilhelmy has shown numerous relict channels joining the Sutlej with the Hakra and

according to us, the ancient Sutlej followed one of these channels along which near a place now known as Fazilka it took a south-south-easterly swing and formed the ancient Shatadru following the Hakra-Eastern Nara and met the Arabian Sea. At present Ravi meets Chenab, but in the past it met the ancient Beas (Vipas). In ancient texts, Ravi (Parasuni) and Beas (Vipas) have been described as belonging to the Shatadru system (Bhargava, 1964). The capture of Sutlej by Indus, Beas by Sutlej and Ravi by Chenab have been



attributed to tectonic changes. The tributaries of the Sindhu below the Siwalik ranges have been subject to long-term variations in river courses. "The Chenab used to flow east of Multan…Ancient Multan stood on two islands in the Ravi, and Indus courses and Nara channel below the junction of the Punjab rivers: 3. coastline at the time of invasion by Alexander (325 BC), Arab conqwuest (711) and around 1600 and 1960; 4. Hakra-Nara course; 5. inland delta near Derawar; 6. Indus course at the time of Alexander; 7 Indus course at the beginning of Arab conquest; 8. Indus course around 1600; 9. Indus course at present. Shatadru as an indepent river system, parallel to Sindhu (Indus); After Wilhelmy, 1969.

In Tamerlane's time the Ravi joined the Chenab below Multan." (Wood, W.A., 1924, Rivers and man in the Indus-Ganges Plains. *Scottish Geographical Magazine*, 40:1-15).

"One of the finest descriptions of the various ancient rivers as mentioned in the Vedas and Sanskrit classics is due to Bhargava (1964), who gave a comprehensive account of the geography of Rigvedic India... According to Bhargava, the present day Chautang is a relict of the ancient Drishadvati... Sarasvati, perhaps the mightiest of all the rivers, has been referred to several times in the R.gveda and Mahabharata. It (lying north of Drishadvati) is said to join the sea near Prabhasa, situated on the western coast. In the Mahabharata however it is mentioned to have disappeared near Vinasana; perhaps the reference pertains to the relict Sarasvati after it was disrupted...

"Pandya (1967) has stated that the very name **saras-vati** means a river abounding in pools and lakes, explaining as a result of flow over an irregular gradient, when the flow got disrupted by earth movements. Interestingly, he has invoked the disappearance of Sarasvati due to land uplift, around 2000 B.C. when the bed of Sarasvati and the floor of the sea at its confluence were upraised... [Note: Brahmasar, Jyotisar, Sthanesar, Kalesvar sar in Kurukshetra and Ravatsar, Jagasr, Dhanasar, Katasar, Datiyasar, Siransar, Pandusar, Vijarasar, Matasar, Batasar, Ranisar in Rajasthan (Tripathi, 1995)].

Evolution of drainage in NW India; After Wilhelmy, 1969. "Wilhelmy (1969) who studied the palaeodrainage of Indian subcontinent mainly concentrated on the upper reaches of the various rivers giving a chronological sequence of their shifts and captures. He has stated that, prior to Alexander's invasion (in 325 B.C.), there prevailed in this part two independent river systems; one comprised the frequently changing Hakra-Nara courses and the other, Indus progressively shifting to the

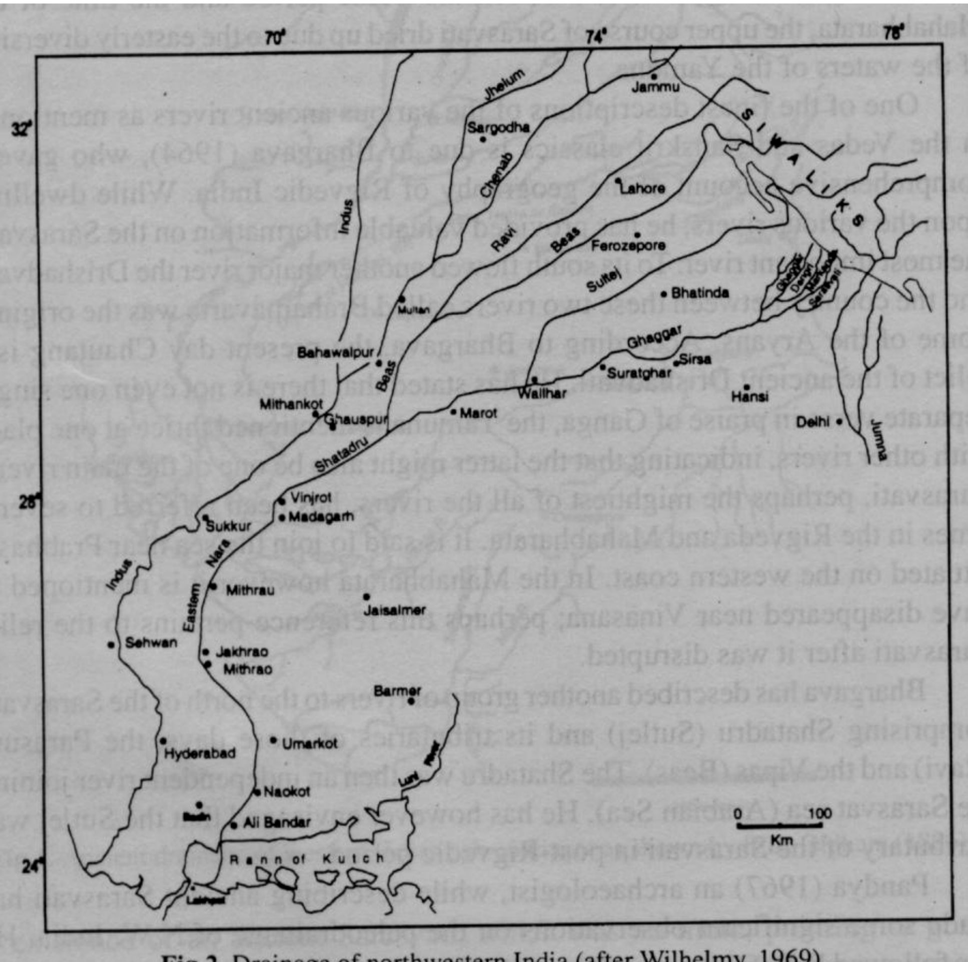
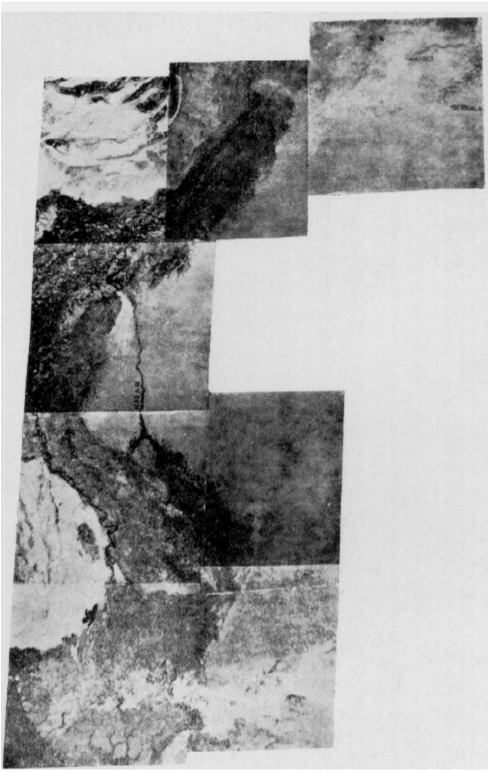


Fig 2. Drainage of northwestern India (after Wilhelmy, 1969).

west...

LANDSAT composite; synoptic view of the river valleys of Sindhu and Sarasvati



showing the possible course of the Sarasvati beyond Marot through the Nara into the Rann of Kutch. The Rann is conspicuous because of the high reflectance (white tone) of the encrustation. (After Yashpal, et al., 1980, Pl. 214 in Lal and Gupta, 1984).

"Yashpal et al (1980)...Using LANDSAT images they stated that the presen dry bed of Ghaggar was that of the ancient river Sarasvati and flowed westward probably extending through the Hakra/Nara to the Rann of Kach. They further stated that Sutlej once flowed into the Ghaggar and that Yamuna flowing westward also debouched into the Ghaggar. Tectonic events were considered to have divered the Sutlej westward and the Palaeo-Yamuna southeastward. This tectonism was also responsible for the subsidence of the middle reaches of the river near Anupgarh causing Ghaggar to disappear...

"Ahmad (1986) has described both the ancient Sutlej and Sarasvati, but his account is rather vague in respect of their relationship. Unlike most previous workers, he has shown the Eastern Nara to be an offshoot of the Indus, ad he did not believe that the Shatadru ever flowed through it. The Sutlej according to him flowed as an independent stream parallel to the Sarasvati. But then he has also suggested the

possibility of the Sutlej being a tributary to the Sarasvati at some point of time. Drishadvati, according to him, was a major tributary of the Sarasvati and was fed by the Yamuna. Tectonic changes forced the Yamuna to swing away to the east, beheading the Drishadvati and depriving Sarasvati of its waters causing it to dry up...

"Valdiya (1996) while discussing the overall drainage change of Indian subcontinent as stated that the legendary Sarasvai rose in the Great Himalaya and formed by the Shatadru. Whereas the Sarasvati and its tributaries held sway in the northern part, the Lavanavati (Luni) had an organised drainage network in the southern part. The Sarasvati was clustered with Harappan settlements dating back to 4600-4500 to 4200-4100 BP. Around 3700 years BP, there was an upstream migration of these settlements, as the climate worsened and salinity set in the lakes of Rajasthan. According to him, tectonic movements changed the course of rivers, beheading them and finally making them disappear. The rise of the Aravalli and concomitant subsidence of the land to the west deflected a number of rivers of the region, due to which the Shatadru (Sutlej) joined the Sindhu (Indus) and he Sarasvati was left high and dry...

“However, when we attempt at tracing the former courses of these rivers we encounter difficulties...

"The ancient drainage system is classified into following four main groups (Fig. 4):

1. Sindhu (Indus) and its tributaries Vitasa (Jhelum) and Asikni (Chenab).
2. Shatadru (Sutlej) and its two major tributaries Vipas (Beas) and Parasuni (Ravi).
3. Sarasvati and its several tributaries in its upper reaches viz. Markanda, Ghaggar and Patialewali, and a major tributary in its middle course.
4. Dishadvati with Lavanavati (?) as one of its tributaries.

The channel of an effluent of the Indus is seen in the Kori Creek in the northwest of Rann of Kutch. The channel course can be traced from the Creek upto Allaha Bund which was created by an earthquake in the region in the nineteenth century A.D. The largest ancient settlement in the Rann of Kutch are: Kotada (Dholavira) in the Khadir island and Surkotada, which is a relatively smaller site but functioned as a military outpost. About 20 kms. from Dholavira is a small settlement of Pabumath, where a seal with 'unicorn' motif and inscription was found and also numerous shell objects. The other sites are: Desalpur, Khirasara (Nakhatrana Taluka) which has yielded seals and a fortified settlement; Bhedi (near the village of Kothara in Central Kutch); a coastal village site of Navinal near Mundra on the Gulf of Kutch. Of these sites, Desalpur and Khirasara have shown evidence for occupation in both Mature and Late phases. "At Surkotada, throughout a compact citadel and residential annexe, complex has been found but no separate city complex as such has been available...Was Surkotada a defensive complex through the centuries to provide protection to the eastern movement of Harappans or a well protected trading center? Well fortified areea, guard rooms in the citadel and residential annexe, engraved figure of a soldier from Period 1C, a large number of sling balls and bone arrow heads from all periods are very interesting evidence in this direction." (Joshi, J.P., 1979, The nature of settlement of Surkotada, in: *Essays of Indian Protohistory*, D.P. Agrawal and D.K. Chakrabarti, eds., Delhi, BR Publishing Corp.: 64)

Chitalwala notes an interesting site of Hajnali located near the junction of the Little Rann, Gulf of Kutch and Saurashtra. "At present the site is three kms. inland from the Gulf. It measures only 60 X 60 m. but has three metres of occupational debris...From its shape and size it seems to have been made up of a group of large structures; in the manner of a trading post...During high tide the waters of the Gulf come close to the site and it seems that in the past it was actually on the Gulf. With the recession of sea level it now stands inland. The name Hajnali is also suggestive in the context. It means 'the place of embarkation for pilgrims bound for Haj'. Likewise Lothal, with its dockyard an dindustrial township, is located much inland today, on the southern shore of Saurashtra… Settlements like Dholavira and Pabumath, which stood on the seashores during the Harappan times, are now on the

margins of the Ranns. Sites like Hajnali and Lothal, also once located on the seacost, now stand further inland. A study of eustasy suggests there might have been a phase of regression in the level of the sea between 5000 and 3000 BP which corresponds with the eclipse of the Mature Phase of the Harappan Civilization." (Chitalwala, Y.M., opcit., 1984, p. 200; Agrawal, D.P. and S. Guzder, 1972, Quaternary Studies on the western Coast of India: preliminary observation, *The Palaeobotanist*, 21 (2): 216-22).

Ancient Drainage Network

Present day and ancient rivers of northwestern India; After Sridhar et al., 1999 (Fig. 4)

"...was the Rann during Harappan times geomorphologically what it is today? The tradition of the Ranns being an arm of the sea is both persistent and persuasive. Those who live in small villages on the margin fo the Rann speak of ships sailing across their waters bringing goods from distant lands. They nostalgically speak of a rich and benevolent merchant named Jagdusha and his ships with full consignment of gold in their holds, anchoring at many points along the shores of the Ranns. However, no one knows exactlyh when the Rann was actually a part of the Arabian Sea. Writing in 1907, Robert Siverights refers to Alexander Burnes who learned 'that vessels had been known to be wrecked on Pacham and that they came for shelter in heavy weather to the island of Khadir' (Siverights,R., 1907, Kutch and the Rann, *Journal of the Royal Geographical Society*, 29 : 531). Siverights further says that the Rann was navigable for many hundred years after the Arab invasion. But, by 1361 it is learnt from the historian who accompanied the Sultann Firuz Shah in the year that he led the expedition to Gujarat 'the intervening area that was

once a marsh was now "a howling desert"' (Siverights, 1907: 531)...Mallinath, the great literary critic of the 14th-15th centuries, also mentions Kutch as a marchy region (Gazetteer of India, 1971: 1). It is, therefore, clear that in the 14th century the Ranns were what they are at present…" (Chitalwala, Y.M., 1984, Harappan settlements in the Kutch-Saurashtgra Region: patterns of distribution and routes of communication, in: Lal and Gupta, opcit., pp. 197-201). S.K. Gupta notes, that based on hydrological studies, 'even as late as 2000 years ago, Little Rann was about 4 m deep' and indicates that the Ranns were indeed under a permanent sheet of water at the time the Harappan culture flourished in Kutch. (Gupta, S.K., 1977, The Indus valley culture as seen in the context of post-glacial climate and ecological studies in northwest India, *Archaeology and Physical Anthropology in Oceania*, 6).

"All these rivers, originated in the Himalayan foothills and after draining large tracts of Panjab and Rajasthan fell into the then existing arm of the ancient Arabian Sea, now marked by the Great Rann of Kach. What is striking about these rivers is that after traversing the wide expanses of the region, their mouths came quite close to one another as mentioned in the R.gveda (Bhargava, 1964). Malik et al (199) have suggested that the present day northern part of the Great Rann represent the palaeo-delta complex comprising the mouth of the Shatadru, Sarasvati and Drishadvati. Tectonic changes in the Kutchregion appear to have caused he Shatadru to swing westward and flow through the Kori Creek into the Sea. The Sarasvati, on the other hand, swung eastward and extended its course through the Great Rann, Little Rann and Nal depression before finally debouching into the Gulf of Cambay near Prabhasa (Bhargava, 1964). Perhaps Drishadvati met this extended channel of Sarasvati in the Great Rann. Dholavira and Lothal, two famous Harappan cities were located along this extended course of Sarasvati.

"Today, Sindhu (Indus) is met by Sutlej while Chenab meets Sutlej. Ravi joins Chenab and so does the Jhelum. Beas meets Sutlej in its upper course (Fig.4). Earlier Sutlej flowed directly to the sea whose dry bed today is seen as Hakra and Eastern Nara (Oldham, 188). Wilhelmy (1969) however has shown that a large part

of the Beas was earlier flowing as an independent river parallel to the then flowing Sutlej and that this old course of Beas was obliterated after its capture by Sutlej near Harike NNE of Ferozepur. The older Beas (Vipas) prior to its capture by Sutlej flowed for a distance of around 300-400 km through Bahawalpur and met Shatadru near Derawar (Fig. 5).

Present day and ancient courses of Shatadru (Sutlej), Vipas (Beas), Parasuni (Ravi) (Sridhar et al. 1999)

Recent History of the Sindhu River

Before understanding the flow of River Sarasvati independent of the present-day course of River Sutlej (S'utudri_ as mentioned in the R.gveda), and independent of River Sindhu, it is apposite to review the evolutionary history of the River Sindhu (Indus).

``Evidence from many sources, including that of archaeological remains associated with old river courses, indicates that a major river, stemming mainly from the same sources as the present Sutlej, flowed through Northern Rajasthan, Bahawalpur and Sind-- to the southeast of the present course of the Sutlej and the Indus -- in the third to second millennium BC. This river, known as the Sarasvati in its upper course, at different times either joined the lower course of the Indus in Sind, or

found its way independently into the Arabian Sea via Rann of Kutch." (Allchin, B., Goudie, A., and Hegde, K., 1978).

R.D. Oldham, 1886, On probable changes in the geography of the Punjab and its rivers - a historico-geographical study, *J. Asiatic Soc. Bengal*, 55: 322-343: `` ... we have now seen that a dry river bed can be traced, practically continuously, from Tohana in Hissar district to the Eastern Narra in Sind ...

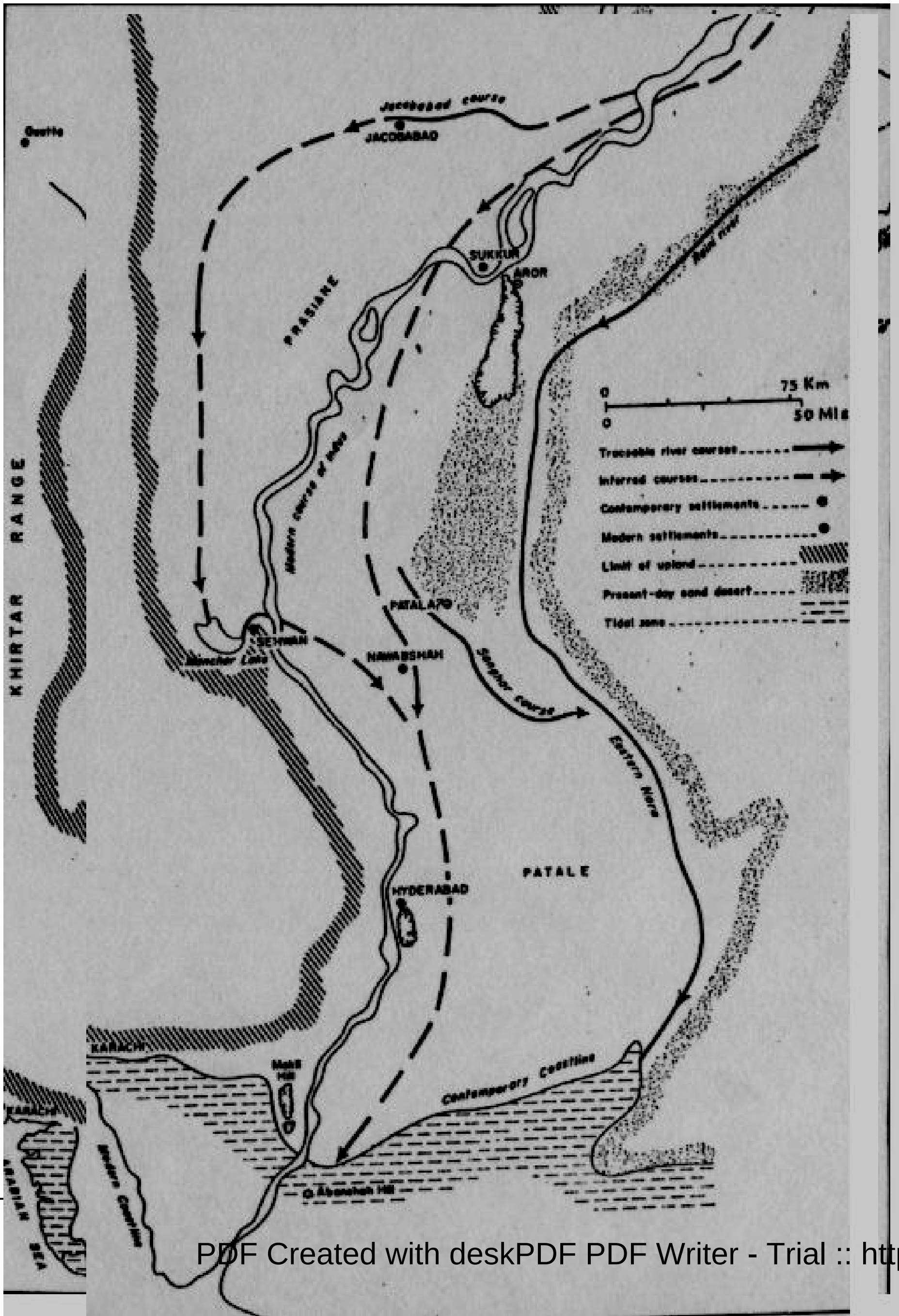
`` C.F. Oldham, 1893, The Sarasvati and the lost river of the Indian Desert, Journal of the Royal Asiatic Society, pp. 48-76: `` ... local legends assert (that Sarasvati) once flowed through the desert to the sea. In confirmation of these traditions, the channel referred to, which is called Hakra or Sotra, can be traced through the Bikanir and Bhawulpur states into Sind, and thence onwards to the Rann of Kutch... attested by the ruins everywhere overspread what is now an arid sandy waste. Throughout this tract are scattered mounds, marking the sites of cities and towns. And there are strongholds still remaining ...

“Amongst these ruins are found, not only the huge bricks used by the Hindus in the remote past, but others of a much later make ... Freshwater shells, exactly similar to those now seen in the PanjAb rivers, are to be found in this old river-bed and upon its banks ... After entering Sind the Hakra turns southward, and becomes continuous with the old river-bed generally known as Narra. This channel, which bears also the names of Hakra or Sagara, Wahind and Dahan, is to be traced onward to the Rann of Kutch... Tha Hakra varies in different parts of its course from about two to six miles in width, which is sufficient for a very large river ... The only river near Marot was the Hakra ...

The dried-up bed -- wadi -- of sarasvati might have constituted the great road between hastinApur and dvArAvatI (dwAraka). Part of this road would have constituted the road from Sind to Delhi via Bahawalpur, MaroT, Anupgarh, Suratgarh, Dabli, Kaalibaggaan., Bht.ner (Hanumgarh), Tibi and Sirsa suggested by Major F. Mackeson in 1844 to the British government (Report on the Route from

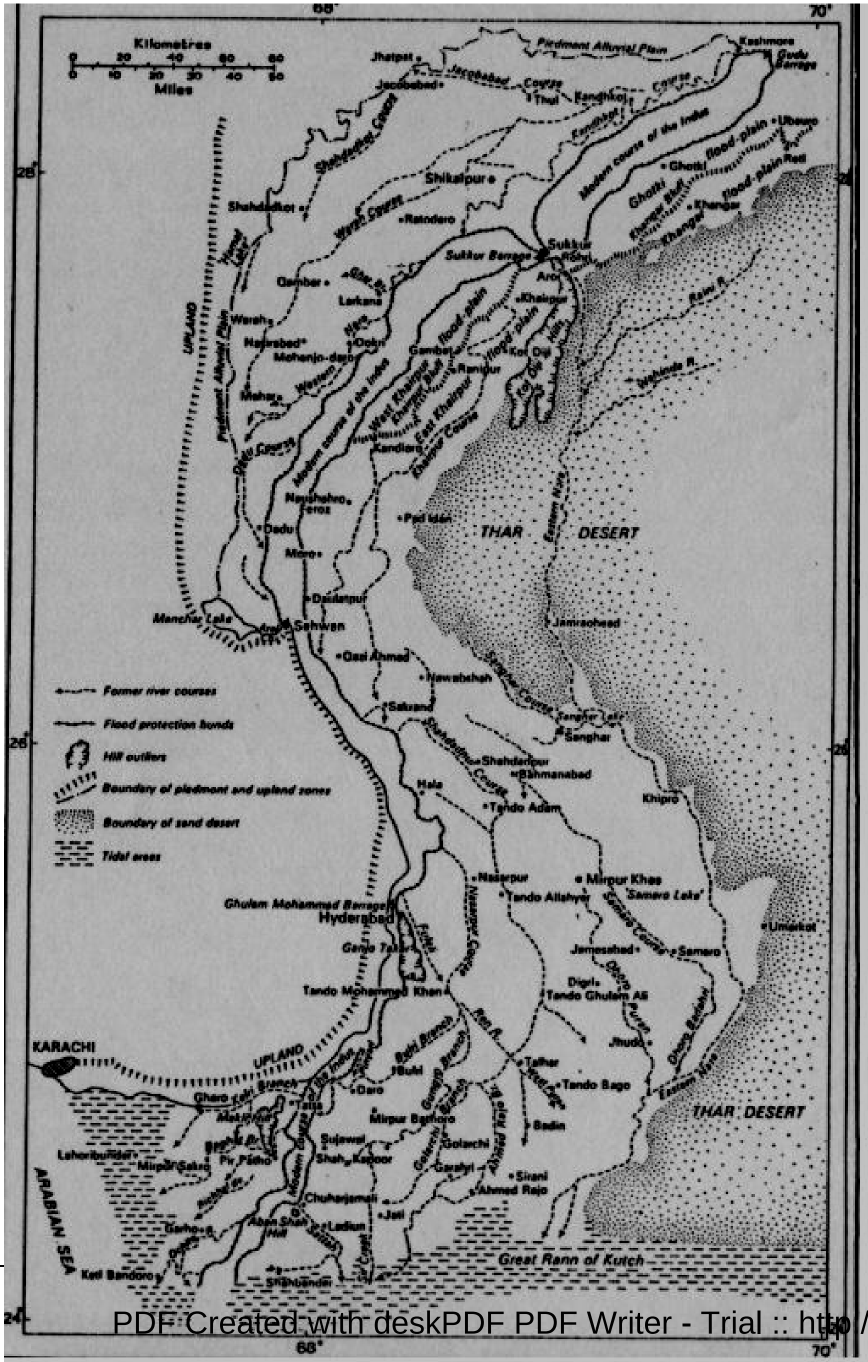
Seersa to Bahawulpore, *JAS, Beng*., XLII, Pt.I, 1844, No. 145 to 153)]. A synonym of sirsa is sarsuti < sarasvati; at this place, about 100 miles below Rassauli, a fortress was built. Stein observes that Anupgarh had alternative names (Mathula Their and Mallavali Their) which indicate that a river was flowing plying boats: "The designation of Mallavali (the 'mound of the boatman'), suggests connection with the story about the ferry boats for which the Mathula ridge is supposed to have once served as a landing place…(another mound in the vicinity is called Jandewala and)…is supposed to have been named after the boatman whom local belief assumes to have taken his boat across the Ghaggar river from Juhanzwala to Mathula." (Stein, A., 1943, *An archaeological tour along the Ghaggar-Hakra River, 1940-42*. American Documentation Institute Microfilm No. ADI-4861: 71-2,76).

D. A. Holmes, 1968, The recent history of the Indus, *Geographical Journal*, 134: 367-382: ``.. Lambrick (H.T., 1967, The Indus Flood-plain and the `Indus' civilization, *Geographical Journal*, 133,4: 483-95) believes that the union of the Sutlej with the Beas (and thence with the Indus) in the West Punjab had already occurred prior to the time of Alexander. It must be assumed that the Nara was continuing to flow as a result of seasonal overspill from both the Indus and the Sutlej, the latter floods using the now dry Ghaggar channel (which is a remnant of the Sutlej-Nara system) ... "



Lower Indus Plain

Course of Indus ca 300 BC



Kilometres
Miles
Jacobabad
Shikarpur
Sukkur
Rohri
Larkana
Mohenjo-daro
Dadu
Moro
Manchar Lake
Sehwan
Nawabshah
Sanghar
Hala
Tando Adam
Mirpur Khas
Hyderabad
Ghulam Mohammad Barrage
Tando Mohammad Khan
KARACHI
UPLAND
THAR DESERT
Badin
Thatta
Great Rann of Kutch
ARABIAN SEA
Keti Bandar
Kashmore
Guddu Barrage
Former river courses
Flood protection bunds
Hill outliers
Boundary of piedmont and upland zones
Boundary of sand desert
Tidal areas
Umarkot
Khipro
Jamrao head

Former courses of Indus

"... The western arm of the Hakra is formed by a combination of three rivers each of which is known as Naiwal. They are designated eastern, middle and western Naiwal. According to Oldham (1893: 58) these streams meet near Kurrulwala (29.33N 73.52E) south of the town of Abohar in Punjab… In the map published by Pande (Pande, B.M., 1977, fig. 2.21) the eastern and middle Naiwals are shown joining the Ghaggar south of Hanumangarh, as well as the western

Naiwal a little further west. Between the western Naiwal and the Sutlej, Oldham has shown two more dry beds both of which join the Sutlej. The eastern of these beds is known as the Dhunda. Oldham was of the opinion that the Sutlej flowed into the Hakra or Sarasvati through each of these dry beds, gradually shifting its course from east to west. When the Sutlej shifted its course westward ‘and abandoned the eastern arm of the Hakra, the Sarasvati, which had been a tributary, was left in possession of the deserted channel, in the sands of which its waters were swallowed up (Oldham 1893: 59)”(Misra, V.N., 1984).

"This paper proposes to outline the probable courses of the River Indus through the former provinces of Sind, West Pakistan, over the past 2000 years, using the evidence obtained from aerial photographs...channels that were still clearly visible as distinct scars...

"Ghotki. The Khangar flood-plain is rather flat and featureless, and the old channel scars are narrow, shallow and poorly defined; their meanders have a smaller radius than the modern river, and are not oriented consistently parallel to it. It is believed that they belong to the Sutlej system, formerly flowing directly to the Nara Valley, before the Sutlej joined the Indus further north Further to the south-east...two drainage lines, the Raini and Wahinda 'rivers', run south-west to join the Nara Valley...Lambrik shows that they are traceable back to the Ghaggar river bed in East Punjab. There is strong evidence of an independent river system running from the Ambala area to the sea via the Eastern Nara, although the date at which this

system dried up remains conjectural... The modern Nara canal is aligned along the course of the old Nara river, which probably had its origin in the waters of the Sutlej, and perhaps even the Jumna, in East Punjab...

"Upper Sind right bank. Several distinct river courses can be traced on the right bank, from Kashmore south to Sehwan...severe floods for which this area is famous. Several of these courses become submerged in the cover flood-plain sediments along along the trough that separates the Indus and piedmont alluvial plains. The most northerly is the 'Jacobabad Course'; which emerges from a confused zone near Kandhkot, running west as a broad channel to near Jacobabad, where it is lost in trough sediments. Although very distinct on the photographs, it is believed that it is a comparatively ancient course, represented by wide areas of coarse-textured sub-strtum to the north of this channel... South of this channel, there is a broad area of meander flood-plain, indicating a prolonged phase of riverain activity, but two distinct river courses emerge, the 'Shahdadkot' and 'Warah Courses'... Further south, there are two conspicous inundation canals, the Ghar Branch and Western Nara. They are now incorporated into the modern irrigation system, but formerly they diverged from the Indus below Sukkur...

"Central Sind left bank (Khairpur-Nawabshah). In the Kot Diji hills, the limestone cuesta that extends south from Sukkur, there is a small gap, the Aror gap, through which the modern Nara canal runs from Sukkur barrage to suply the old Eastern Nara. The old city of Aror was sited on the sides of this gap. The modern Indus runs through a similar but large rgap between Sukkur and Rohri...

"The chronology of former river courses... The remains of the southern capital, Mohenjo-daro, lie south of Larkana, but its proximity to the right bank of the modern river is purely coincidental... 326-325 BC....it is believed that the Indus flowed north-west of Sukkur (See map)...The Indus is described as forming two large islands, Prasiane in the north and the rather small Patale in the south...(D.A. Holmes, The Recent History of the Indus, in: *Geographical Journal*, London, 1968, Vol. 134, Part3, September 1968, pp. 367-383).

Bimal Ghose et al (1979) use images taken in 1972. Plate V traces the wide valley of the Sarasvati running from Suratgarh through Anupgarh to Fort Abbas and Ahmadpur East. From Anupgarh another wide belt of discontinuous patches of dark grey tone runs southwestward upto Sakhi. From Sakhi, the remnant of a former valley can be traced towards the west ... the imagery reveals the presence of a narrow zone of saline/alkaline fields, partly obliterated by the overlying sand dunes, extending upto Khangarh. To the south of Khangarh, a narrow strip of green vegetation, producing a slightly darker tone than the surroundings, can be identified. It runs from Islamgarh, through Dharmi Khu, Ghantial, Shahgarh, Babuwali and Rajar to Mihal Mungra. This was the course of the Sarasvati from the Himalaya to the Rann of Kutch after the river severed relations with Luni. South of Mihal Mungra, the course could be traced up to the present Hakra channel and there are indications of its having even crossed the Hakra channel (Plate VI). This signifies that the course of the old Sarasvati might have been somewhere to the west of the present Hakra ... The other major courses of the Sarasvati could be identified further to the west, through Mithra and Sandh, the remnants of which are now known as the Raini and the Wahinda rivers. Here also the river shifted its course several times, and, at one time, flowed to the east of the Wahinda river, through Mundo. Finally, the river ceased to flow southward and met the Sutlej to the west of Ahmadpur East.

The Ancient River Valley on the Eastern Border of the Sindhu Plain and the Sarasvati Problem

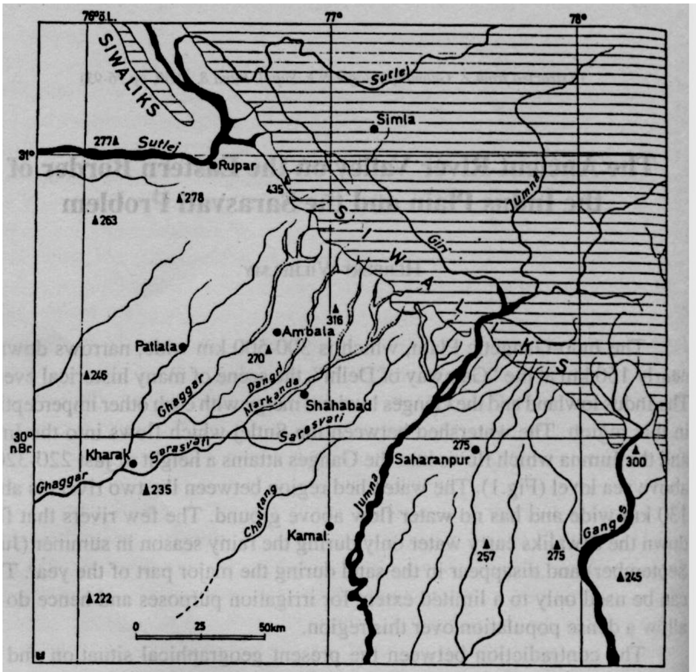
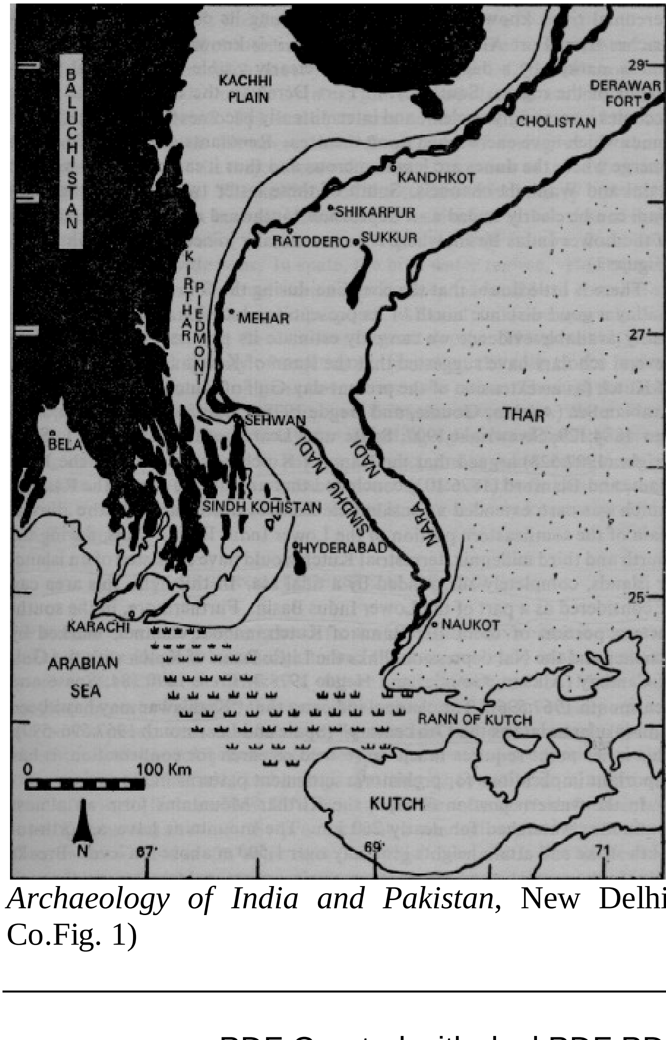


Fig.1. Watershed region between the Indus and the Ganges.

Watershed region between the Indus and the Ganges (After Wilhelmy, H., 1969, Das Urstramtal am Ostrand der Indus ebene und das Sarasvati Problem, *Zeischrit fur Geomorphologie*, Supplementary Band 8, pp. 76-95; English tr. extracts in: B.P. Radhakrishna and S.S. Merh, eds., *Vedic Sarasvati*, 1999, pp. 95-111; Fig. 1).

"...The watershed between the Sutlej which flows into the Indus and the Jumna which flows into the Ganges attains a height of just 220-320m above sea level (Fig.1). The watershed region between the two rivers is about 130 km wide and has no water flow above ground. The few rivers that flow down the Siwaliks carry water only during the rainy season in summer (June-September) and disappear in the sand during the major part of the year...

"...there exists a river bed at a distance of 40-110 km to the East of that part of the Indus that flows North-South; the course of the old river bed is surprisingly parallel to the present mainstream)(Fig.4)... This dry bed is indeed the holy river "Sarasvati" known to Indian tradition (Barnett, 1913, p. 25; Stein, 1942, p. 173) or the famous "Lost River of Sind" (Raverty, 1892); once upon a time this was a genuine solitary river which reached the ocean without any tributaries on its long way through the desert. In its native land, this river has been known as Hakra, Ghaggar, Sagar, Sankra or Nala Sankra. Inside Sind, the various parts of the river were called Raini Nullah, Wahinda, Nara (Nara or Naga = snake in the Sindhi language, indicates the winding course of the river bed) and Hakra...

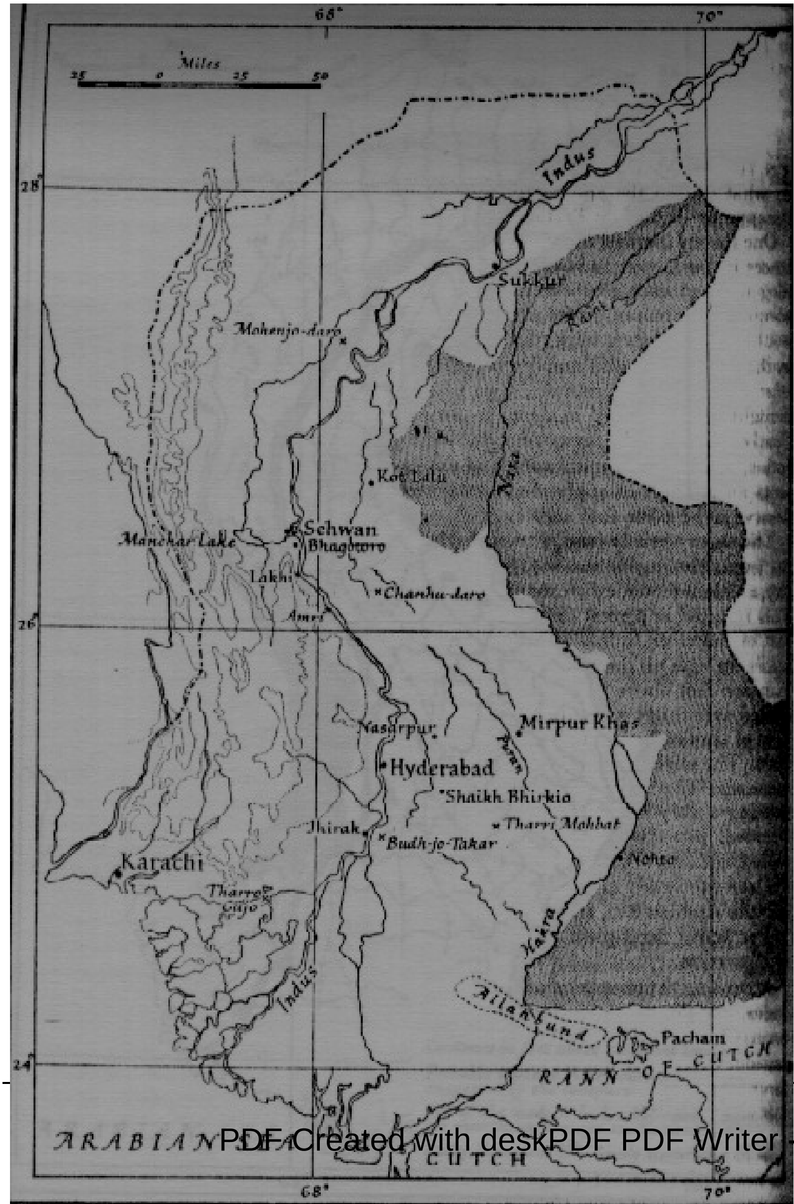


Palaeogeography of Sind (ca. 4000-2000 BC. (After Flam, Louis, 1986, Recent explorations in Sind: paleogeography, regional ecology, and prehistoric settlement patterns (ca 4000 – 2000 BC), in: Jacobson, Jerome, ed., *Studies in the Archaeology of India and Pakistan*, New Delhi, Oxford and IBH Publishing Co.Fig. 1)

“Post-Pleistocene Paleogeography of Sind. The Lower Indus Basin is a submerged geosyncline which was supplementally formed as a foredeep between the upheaval and folding of the Himalayan Mountains and the stability of the Peninsular Foreland Shelf, or Deccan Shield (Brinkman, Robert and Rafiq, Ch.M., 1971, Landforms and Soil Parent materials in West Pakistan, *Pakistan Soils Bulletin* 2; Hunting Survey Corporation, 1961, *Reconnaissance Geology of Part of West Pakistan*. Toronto, Govt. of Canada)...We know from the writings of Arab geographers that the Indus River adopted its present course through the limestone hills near Sukkur sometime between the tenth and thirteenth centuries AD...The evidence suggests that during the prehistoric period under discussion two independent river courses flowed through the Lower Indus Basin.

“The one in the western portion of the region I refer to as the Sindhu Nadi, and the one in the eastern portion of the region the Nara Nadi. The Sindhu Nadi had its origin near the present-day town of Kandhkot. A short distance west of Kandhkot, the river’s course turned southwestward, passing west of Shikarpur and Ratodero, through Warah, and west of Mehar. South of Mehar the course continued its path in a southerly direction down the western flank (or Sind Hollow) of the Lower Indus Basin, passing through and just north of the present-day Manchar Lake; it then followed an easterly course near the town of Sehwan. To the east of Sehwan, landforms of the Sindhu Nadi have been obliterated by the more recent active courses of the Indus River. The path of the southernmost portion of the Sindhu Nadi can be traced southeast of the present-day town of Nawabshah on the aerial photographs. In this area the Sindhu Nadi followed a southeasterly course through the town of Samaro and joined the course of the Nara Nadi south of the town of Naukot. In the eastern portion of the Lower Indus Basin, the Nara Nadi was a perennial river, known by various names along its course.

"In its northerly reaches from Fort Abbas to Fort Derawar it is known as the Hakra River, and is marked by a depression which is clearly visible on the aerial photographs of the region. Southwest of Fort Derawqar, the course of the Hakra becomes increasingly unclear, and intermittently becomes 'lost' beneath sand dunes which have encroached upon the area. Remnants of the river's course emerge where the dunes are less numerous and thus it can be aligned with the Raini and Wahinda channels. South of these latter two channels the Nara Nadi can be clearly traced as a depression southward along the eastern edge of the Lower Indus Basin, where it was



eventually joined by the Sindhu Nadi.

"There is little doubt that the coastline during the fourth and third millennia lay a good distance north of its present-day location. However, on presently available evidence, we can only estimate its prehistoric conformation. Several scholars have suggested that the Rann of Kutch and the Little Rann of Kutch (as an extension of the present-day Gulf of Kutch) were inlets of the Arabian Sea. Sivewright concluded that an inlet, of which the Rann of Kutch was part, extended a considerable distance northward into the alluvial plain of the southeastern portion of the Lower Indus Basin. (Sivewright, Robert, 1907, Kutch and Ran, *The Geographical Journal* 29 (5) : 528)

"Furthermore, in the south-eastern portion of the Little Rann of Kutch, an old channel, marked by marshes and the Nal depression, links the Little Rann of Kutch with the Gulf of Cambay . (Frere, H. Bartle E., 1870, Notes on the Runn of Kutch and Neighbouring Region. *Journal of the Royal Geographical Society* 40: 181-207). The channel indicates that 'Kathiawar may have been semi-insular as late as the 17th century.' This latter point requires much more field research for confirmation; it has important implications for prehistoric settlement patterns in the region." (Louis, 1986, Recent explorations in Sind: paleogeography, regional ecology, and prehistoric settlement patterns (ca 4000 – 2000 BC), in: Jacobson, Jerome, ed., *Studies in the Archaeology of India and Pakistan*, New Delhi, Oxford and IBH Publishing Co., p.68)

Sarasvati River in Sind (Raini = Nara-Hakra channels) beyond Allahbund joining the Rann of Kutch. "The fundamental idea—of tectonic uplift in the Lower Indus plain causing, or contributing to cause, the destruction of Mohenjodaro by complete submersion—seems to have been first suggested by the palaeontologist Dr. M.R. Sahni in 1952...The data on which his theory was based had been observed by him in 1940-41: namely, a thick mass of alluvium containing shells of freshwater snails lying on Budh-jo-Takar, a flat-topped rocky hill about 24 miles south of Hyderabad, Sind, at a level at least sixty feet above the bed of the Indus

flowing near by...I conceive than an avulsion and major change of course by the Indus took place considerably up-stream of the city. The new bed being (ex hypothesi) lower than the old one and, say, thirty miles away to the east and, close to the western flank of the Khairpur hills, inundation spill thereafter did not apoproach within twenty miles of Mohenjodaro, and the surrounding country, starved of water, immediately began to deteriorate."(After Lambrick, H.T., 1967, The Indus flood-plain and the 'Indus' civilization, in: *Geographical Journal*, vol. 133, Part 4, December 1967; Fig. 1, pp. 483-495).

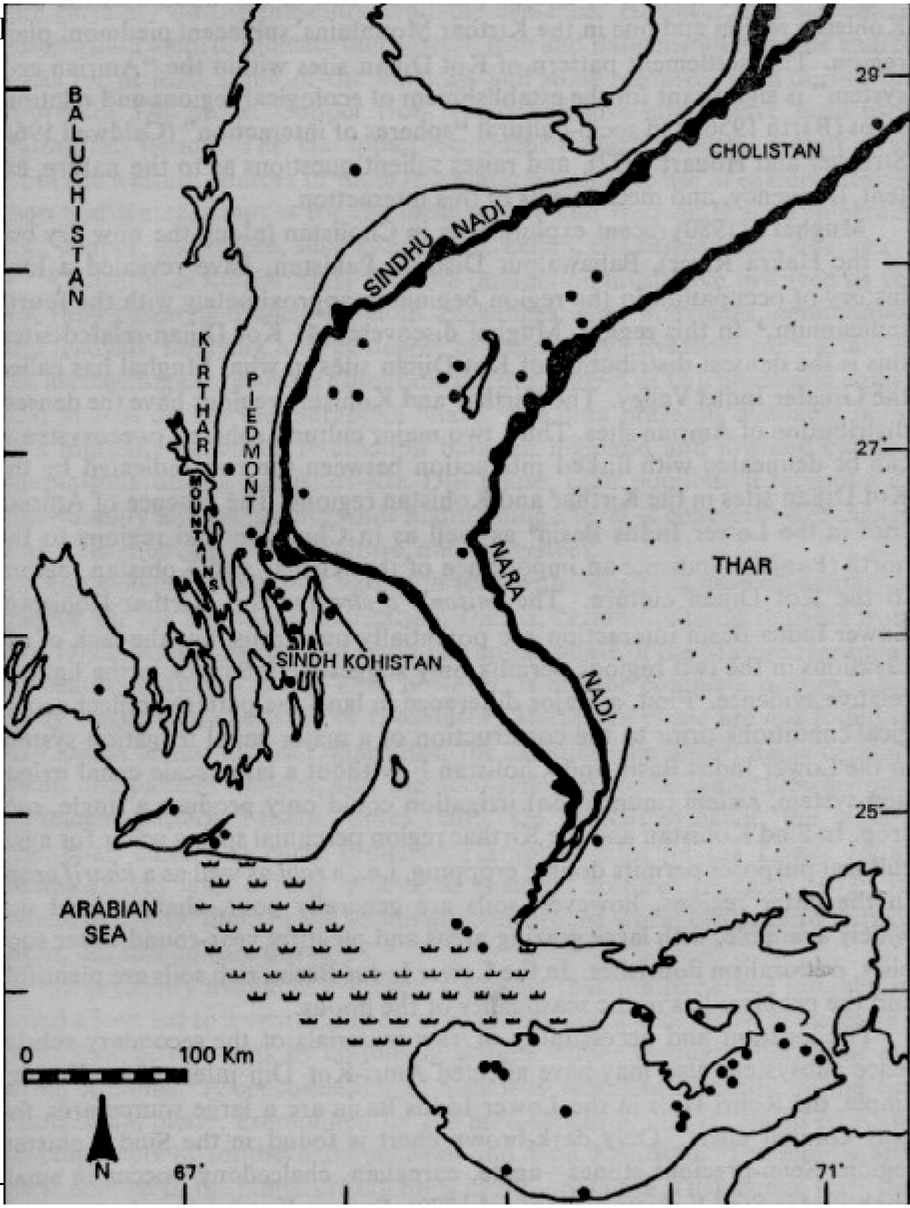
"Prehistoric settlement in Sind...The temporal priority of Amrian and Kot Dijian occupations to Harappan levels has been well established by excavations at the respective type-sites (Amri and Kot Diji), and qualifies them as pre-Harappan, or in Mughal's terminology, Early Harappan (Mughal 1970). Although few in number, available radiocarbon dates (MASCA corrected) for this phase indicate a time span from about 3600 to 2500 BC (see Dales, George F., 1973, Archaeological and Radiocarbon Chronologies for Protohistoric South Asia, in: *South Asian Archaeology*, Norman Hammond, ed., pp. 157-169, London. Duckworth)...Indeed, the settlement pattern maps show a clear 'movement' of population through time from the Sind Kohistan and Kirtihar regions to the Lower Indus Basin from the end of the fourth millennium to the middle of the third millennium...

"Mughal's (1980) recent explorations in Cholistan (along the now dry bed of the Hakra River), Bahawalpur District, Pakistan, have revealed a long history of occupation in the region beginning approximately with the fourth millennium. In this region, Mughal discovered 41 Kot Dijian-related sites...Semi-precious stones—agate, carnelian, chalcedony—occur in small quantities in Sind Kohistan. Eastern Kutch is another source area for agates. Copper sources are known in Rajasthan, Kutch, Las Bela, Jalawan, and Sarawan in Baluchistan, and in eastern Iran. Steatite can be found in eastern Kutch and in south-eastern Iran...

"The Harappan settlement pattern indicates a shift away from the western sources for the most widely and frequently used minerals, e.g., copper and stones, such as

agate, carnelian, chalcedony, and steatite...The settlement pattern thus shifts to the northeast (Cholistan), the east (Lower Indus Basin), and the southeast (Kutch) to control more closely the exploitation of resources from their sources. The major exchange routes shift away from the hills in the west and onto the rivers and their plains to the east." ." (Louis, 1986, Recent explorations in Sind: paleogeography, regional ecology, and prehistoric settlement patterns (ca 4000 – 2000 BC), in: Jacobson, Jerome, ed., *Studies in the Archaeology of India and Pakistan*, New Delhi, Oxford and IBH Publishing Co., p. 82)

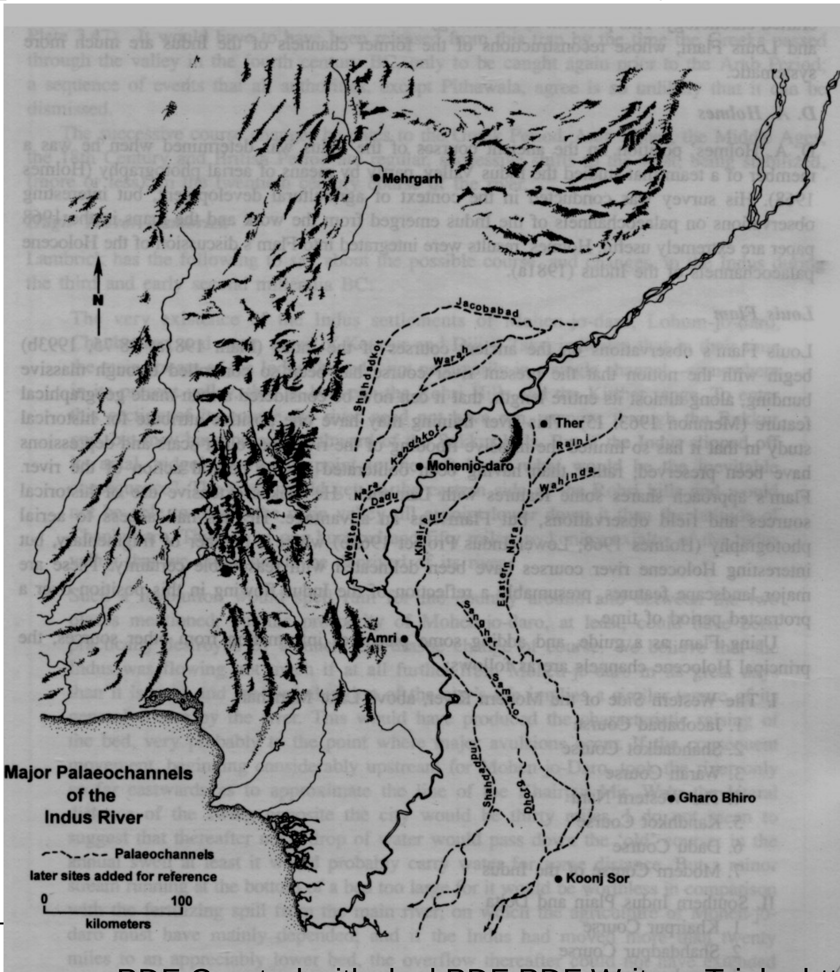
Harap


BALUCHISTAN
CHOLISTAN
SINDHU NADI
KIRTHAR MOUNTAINS
PIEDMONT
THAR
NARA NADI
SINDH KOHISTAN
ARABIAN SEA
0
100 Km
N
67°
71°
29°
27°
25°

Sind:

paleogeography, regional ecology, and prehistoric settlement patterns (ca 4000 – 2000 BC), in: Jacobson, Jerome, ed., *Studies in the Archaeology of India and Pakistan*, New Delhi, Oxford and IBH Publishing Co., Fig. 5)

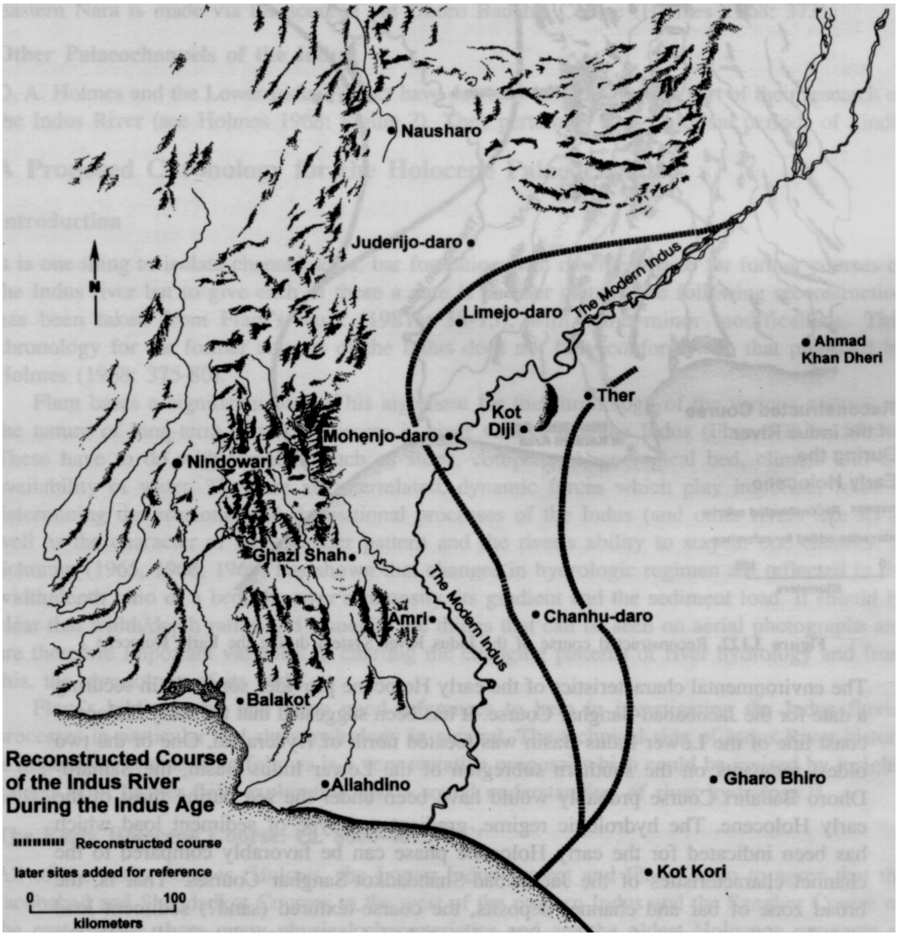
Palaeochannels in Sindh (After Possehl, G.L., 1999, Fig. 3.121). Using aerial photographs (Holmes, D.A., 1968; The recent history of the Indus. *The Geographical Journal*, 134(3): 367-82; Lower Indus Project, 1965, *Lower Indus Report: Physical*



Resources. Vol. 2, Geomorphology, Soils and Watertable. Karachi: Ferozsons), Louis Flam has delineated Holocene course remnants of the Indus rivers and also courses ancestral to the present course but not as old as the Holocene course remnants (ca. 8000-4000 BC). On the western side of the present-day Sindhu river are the oldest Holocene course remnants: Jacobabad, Shahdadkot, Warah; and in the southern Sindhu delta are the oldest Holocene course remnants: Sanghar, Samaro-Dhoro Badahri courses. The palaeochannels ancestral to the present-day course but not as old as the Holocene remnants are: Kandhkot on the west and Khairpur and Shahdadpur on the east.

This delineation seems to confirm the statement made in Marshall's Mohenjodaro report that Mohenjodaro ca. 2500 BC was an island caught between the Sindhu River and the Eastern Nara (what we now to be the Sarasvati River) course. The delineation of the ancient courses of the Sindhu follow the arguments provided by Butler, B.E., 1950, A theory of prior streams as a causal factor of soil occurrence in the riverine plain of southeastern Australia. *Australian Journal of Agricultural Research*, 1: 231-52; Pels, Simon, 1964, The present and ancestral Murray River System. *Australian Geographical Studies*, 2: 111-19; and Schumm, S.A., 1968, River adjustments to altered hydrologic regimen—Murrumbidgee River and palaeochannels, Australia. *United States Geological Survey Professional Paper*. Washingtron D.C.: U.S. Geological Survey. The Kandhkot Course which is "…for most of its length a single channel, narrow, deep, and winding, running parallel to the modern Indus river from Kashmore, through Kandhkot which is located on its bank, to the south of Shikarpur, where it is cut by the modern Indus." (Holmes, 1968: 371). The Khairpur Course begins below Sukkur. The Shahdadpur Course "…emerges from the modern river about eight kilometers below Sarkand and can be traced just west of Shahdadpur, east of Tando Adam and south to Tgando Allahyer. It has the same features of the deep, winding channels and high bar deposits as Khairpur Course and is probably a continuation of it" (Holmes, 1968: 373).

Palaeochannels of Sindh ca. 4000-2000 BC (After Possehl, G.L., 1999, Fig. 3.123).



Combining the Warah Course in the northwest and the Samaro-Dharo Badahri Courses in the south, Flam notes that the combined course may represent the prehistoric course of the Sindhu. A conjecture is that the Western Nara was part of this course. Possehl, however, notes that this reconstruction may be erroneous since

there is no evidence that the river flowed on the high ground between Lakhi Hills and the Bado Range if ever the river flowed into the Lake Manchar hollow.

Two significant locii emerge from this picture of settlements in Sind. What Louis Flam calls the Nara Nadi was indeed, the independent, perennial Sarasvati River System, combined with the waters of the Sindhu (below Naukot), had extended beyond the Little Rann of Kutch to link up with the Gulf of Khambat through the Nal depression. The settlements were close the raw material resources of the Bronze-age civilization, in particular the copper resources of Khetri mines in Rajasthan.. "To the east, the alluvium of the Indus seems very old and is interdigitated with silts from the Eastern Nara…The land surface is old and is now largely covered by shifting sand dunes so large that they can chose rivers. The sands hold seasonal lakes or dhands that are now used by pastoral nomads for agriculture and domestic water. The presence of a scatter of small prehistoric archaeological sites in this desert fringe is evidence that the same was probably true during the Indus Age." (Possehl, G.L., 1999, p. 284; loc. cit. Lambrick, 1964: 88-9). Eastern Nara may be viewed as the extention of the Sarasvati River System beyond Bahawalpur Province towards the Rann of Kutch.

"To avoid all confusion, and following a suggestion by Lambrick (1964, p. 229), in the following discussion, we shall refer to the upper part of the dry bed up to Derawar as Hakra and the lower course from the Ghauspur depression southeast of Mithankot up to the Rann of Kutch as Nara- although this convention does not quite correspond to the local usages. For example, the local usage, the lower course is also given the name Hakra. The local people were probably aware of the continuity of the entire line of the valley and that a single river flowed here once upon a time...

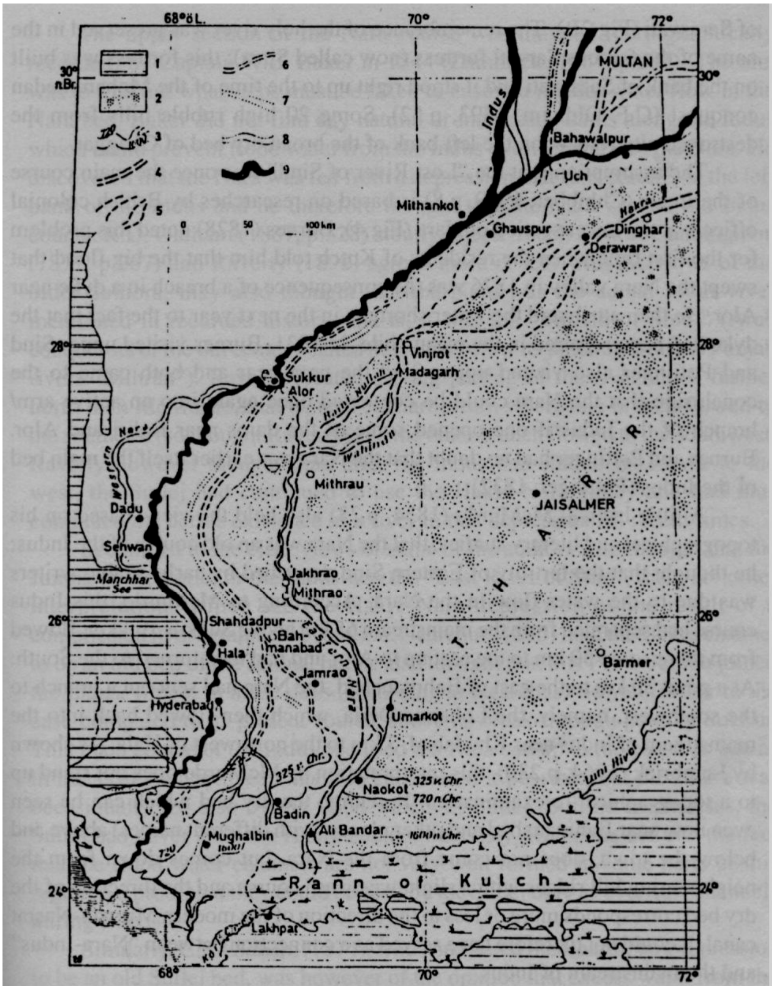


Fig.4. Indus courses and Nara channel below the junction of the Punjab rivers. 1. northwestern and southeastern mountain ranges, solid rock in the Indus plain, 2. Sand fields and dune fields of the Thar desert, 3. Coastlines at the time of invasion by Alexander the Great (325 B.C.), Arab conquest (711/12), and around 1600 and 1960, 4. Hakra-Nara course, 5. Inland delta near Derawar, 6. Indus course at the time of Alexander, 7. Indus course at the beginning of Arab conquest, 8. Indus course around 1600, 9. Indus course at present.

"Stein (1942, p. 181) drew attention to the

region around Derawar where the broad Hakra bed breaks up into an inland delta marked by a number of dry channels spread out like a fan. Near Vinjrot (Wanjh-rut), at about 28 deg. N (latitude), the river bed again assumes a well defined form (Fig.4) but again near Madagarh, the Nara breaks up once again and loses its name at the same tim. The river Wahinda forms the eastern arm and the river Raini Nullah forms the western arm. The two arms join with each other 25 km to the north of Mithran, a village on the old caravan route from Rhori-Alor to Jaisalmer.

"The Wahinda river bed is broad, flat at many places, where it is covered up by sand, and it is difficult to notice the bed. One gets the impression that the huge flood tides of the Indus, which swept occasionally down the river Wahinda after the end of the perennial flow through the "lost river", filled up all the basins between the dunes and seeped down and got lost in sand fields. On the other hand, the Raini forms a deep channel, only 40 m broad in some places, with steep banks 4-6 m high. This well marked bed lost its original function as part of the Hakra-Nara system, but a part of the Indus flood water flowed down this bed now and then and made it deeper (Lambrick, 1964, p. 31). The Raini is therefore rightly called "Nullah" (= water course). Of course, the flood waters would have often exceeded the holding capacity of the "Nullah".

"Some 55 km southeast of Sukkur, the combined bd of Raini and Wahinda meets the part of the "Eastern Nara" that flows exactly north-south, at an acute angle. Over the last 100 years, a stretch of over 300 km of this dry bed is being used by a large irrigation canal that branches off from the Indus near Rohri opposite Sukkur. This irrigation has been extended by the constrution of the Lloyd Barrage (1932). This artificial water course still has all the characteristis of the erstwhile river that it has replaced, its meandering course follows a shallow valley which is occasionally 3-5 km broad and gets narrowd now and then due to dunes. At times of extraordinary floods, the river bed gets filled up from bank to bank, but the high tides usually flow off very quickly again (Raverty, 1892). In 1859, when the eastern Nara Canal was commissioned, the engineers made an interesting observation: some of the depressions that run parallel to each other to the East of

the irrigation canal between the sand dunes of Thar got filled with water. Presumably the erstwhile Nara would also have flowed further to the East, if sand dune ranges had not blocked this lower valley line (Lambrick, 1964, p. 32)... The Kori Creek was once the outlet for the water masses flowing down the Hakra-Nara depression with a total length of 1300 km. (Fig. 4)...

"Five different hypotheses emerge from the discussion on the "Lost River of Sind" that has been going on over the last 140 years:

1. Hakra and Nara were once upon a time the course of an ancient Jumna (or Proto-Jumna) flowing independently (without tributaries) into the Arabian Sea.
2. Hakra and Nara were the bed of the mythical Sarasvati which was fed by the Ghaggar and by the source river of the present Sutlej before the old Sutlej lost its hydrographic independence and became a tributary of the Indus.
3. Hakra and Nara are an earlier course of the Indus, the Indus has migrated to the west and left this course.
4. In a very distant past, the Hakra and Nara courses or different sections of these courses were used at different times by the Jumna, Sutlej and Indus.
5. Hakra and Nara never carried water independently; they always served as additional discharge paths of Jumna, Sutlej or Indus during floods.

"As mentioned earlier, the number and size of the ancient setlements are in striking contast with the sparse population in this region now. Dozens of large deserted residential hillocks form a border along the dry bed of Hakra; Stein studied these chains of former villages over a distace of more than 300 km downstream of Bhatnir, Suratgarh, Wallhar, Phulra, Mirgarh, Marot, Maugarh, Dingarh and Derawar. Only Derawar has been preserved because of its significance as a fixed place at the beginning of the caravan route along the Hakra course (Stein, 1942, p. 181). Excavations in the settlement hillocks show evidence of a continuous settlement from the Harappan period (2500-1500 BC) right up to the Kushan

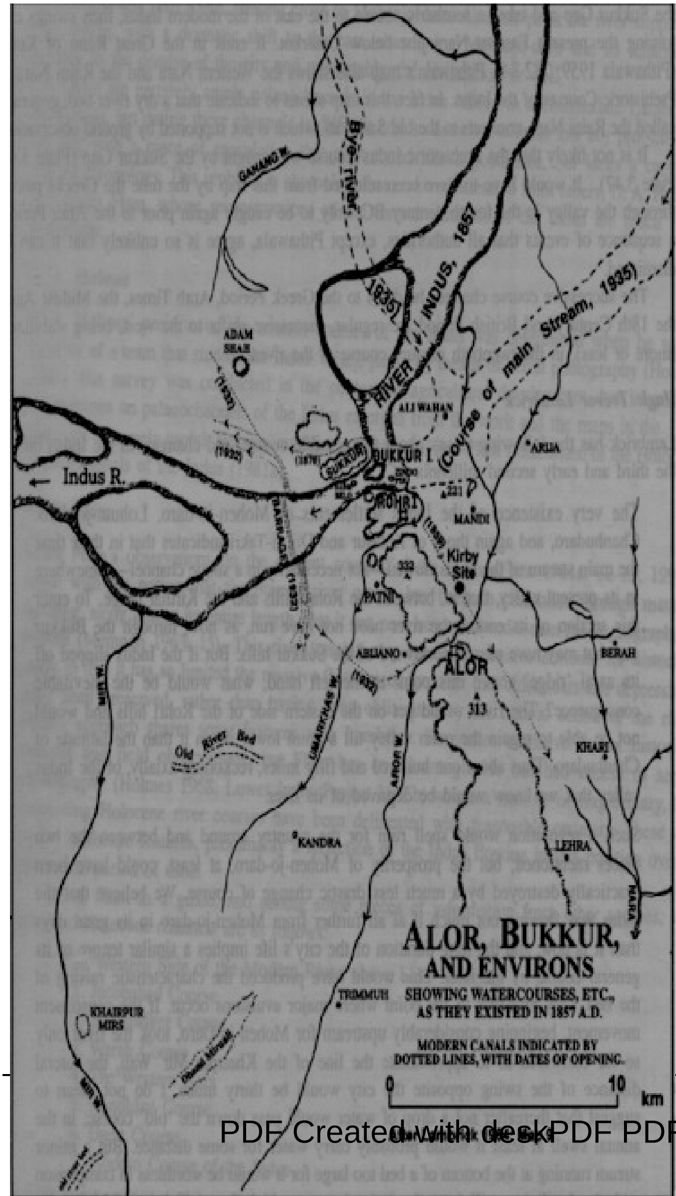
period (50 BC-229 AD) and in some places right up to the 16th century. The age of the archaeological findings thus corresponds to the traditional beliefs. Stein (1942, p.182) is certain that even as late as in the Vedic period (around 1500 BC) a big river flowed through the Hakra-Nara depression...

"When the upper Jumna adopted its present course and finally ceased to supply water to the Hakra (Fig. 2B), in the Vedic period (around 1500 BC), the Sarasvati flowed through the Hakra-Nara depression into a shallow Bay of the Arabian Sea; from the 11th century, the salty swamp of the Rann of Kutch took the place of the shallow bay (Wilhelmy, 1968a, p. 183)...

"Sarasvati...this river must have had, besides its small Siwalik source river, a maor source river in the Himalaya and it must have received glacial water. The small Siwalik rivers would not have been enough to supply all the water in the Sarasvati. In other words, the Sarasvai must have had a source river in the Himalaya; the Sarasvati must have lost this source river either due to a diversion or tapping, as indicated by the sharp bend near Rupar (Fig. 3D). This would justiy a Himalayan source for the river Sarasvati...

"Summing up, we may say: right up to the pre-Alexandrian period, there were two independent river systems in the Indus plain: the Hakra-Nara courses subject to several changes over a long period and the Indus marked by its continuous westward migration. Jumna and Sutlej determined the hydrographic evolution in the watershed region between Indus and Ganges. After the proto-Jumna (up to about 2000 BC), the mythical Sarasvati flowed around 1500 BC through the Hakra-Nara depression towards the Arabian Sea, the Sarasvati being fed with water mainly by the proto-Sutlej (Sarasvati-Sutlej). Also a later Sutlej course (Hakra-Sutlej) ensured water flow thorughout the year right up to 600 BC through the "ancient river valley on the Eastern border of the Indus plain". The proto-Jumna and the proto-Sutlej used the same Hakra bed one after the other, although they had different upper ocurses. There are no morphological or historical evidences for the thesis that besides the Indus, once upon a time, Sutlej, Jumna and Ganga flowed

independently into the Arabian Sea, that is simultaneously four parallel rivers flowed into the Arabian Sea (see map of Ahmad and Abbasi, 1960, p. 45).



"The Hakra-Nara system began to degenerate in the pre-Alexandrian period itself. Due to canals or diversion of the upper courses of the Juma and Sutlej, fed with glacial waters from the Himalayas, the Hakra-Nara system gradually lost its autonomy. Ganges and Indus widened their catchment areas, and he old river channel at the edge of the Thar began to receive only the excess flood water from the Sutlej from the 6th century BC, the flood water discharge (probably) happened regularly every year.

"Canals and diversion of the Himalayan source river made the Sutlej into a tributary of the Indus, the Hakra thus ceased to be a perennial river. The erstwhile Sarasvati valley (= Hakra) merely served as a temporary flood water channel and by mid

13th century even this water flow from the Sutlej became scantier and scantier (C.F. Oldham, 1893, p. 66), and from the beginning of the 16th century, the flow stopped almost completely (Lambrick, 1964, p. 189). From this time onward, any water flow through the Hakra became an extraordinary event...

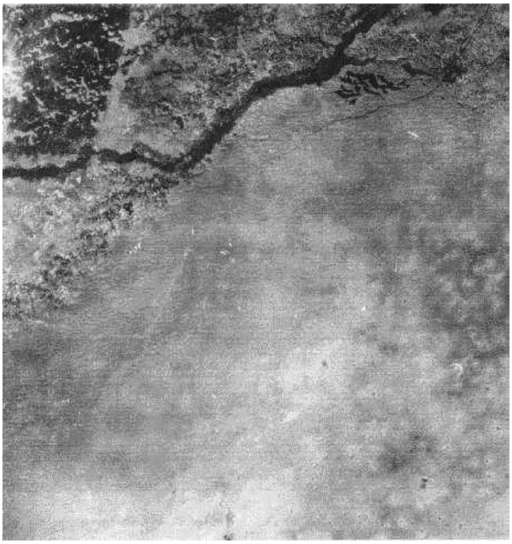
"Sutlej water flowed into the Hakra through the dry valleys running from the northeast near Bhatnir, Wallhar and Kudwala. The Hariari ("fruit bringer") which runs parallel to Panjnad below the confluence of the Sutlej and Chenab served as a smaller flood water outlet (Buckley, 1893, p. 157). Finally, the depression of Ghauspur to the south of the junction of the Punjab rivers was the gate through which a part of the Indus flood waters occasionally found its way to the Rann of Kutch right up to recent times. As a result of this, the Nara channel could even turn temporarily into a navigable river. It is thus reported that in the year 1742, it was possible to transport building stones by river route from the Rhori hills between Sukkur and Alor upto Umarkot (Fife, 1857, p.40). But after such isolated years with plenty of water, there folowed longer and longer periods with no flood water at all. As a consequence, the people living in the area of eastern Sind, which was once well irrigated and thickly populated, lost their basis of life and had to migrate westward. Many ruins in the Thar "desert" and its border are evidence of the degeneratin of the old cultural landscape (Ahmad and Abassi, 1960, p. 45). Also Alor, once an important town south of Sukkr, not far from eastern Nara, had to be deserted by all its residents (Cousens, 1929, p.5).

"The original hydrographic situation in the Hakra-Nara depression has been reestablished to a certain extent by modern engineering. In 1859, the Nara was converted once again into a perennial "river" by means of a transverse canal which branches off from the Indus near Rohri above the break-through point at Sukkur (Eastern Nara Canal). Around the same period, the old river courses of the Punjab became well-known through surveys extending over the entire region. Canals were built at two points on the Sutlej, namely, the Hakra channel near Wallhar and Kudwala. The dry beds in the watershed region between Jumna and Sutlej, which owe their evolution to either of these rivers, have likewise become guiding lines for

modern irrigation channels. It has thus been possible to make the old river courses, which remained dy for centuries, once again useful for the people"

Sindhu River at Sukkur and old channels (After Lambrick, 1964: Fig. 9; Possehl, G.L., 1999, Fig. 3.120). Today, Sindhu flows through the Sukkur Gap, a break in the Rohri Hills. The river flows through a gorge at the mouth of which is the Bukkur island. The stream becomes only 550 metres wide but over 20 metres deep. There are some suggestions that the Sindhu River did not flow through this Gap during the Indus Age but had flowed to the north around Sukkur. According to Pithawala (1959: p. 284), ca. 3000 BC the river took a southerly course to the east of the modern course, swung east joining the present Eastern Nara just below Umarkot and ending up in the Rann of Kutch. "…the main stream of the Indus flowed…somewhere in its present valley, that is, between the Rohri Hills and the Kirthar range. To enter this section of its course the river need not have run, as now, through the Bukkur gap, but may have passed northward of the Sukkur hills. But if the Indus slipped off its axial 'ridge' above this point to the left hand, what would be the inevitable consequence? The river would get on the eastern side of the Rohri hills and would not be able to regain the main valley till a point lower down it than the latitude of Chanhudaro. Thus about one hundred and fifty miles, reckoning axially, of the Indus valley that we know would be deprived of its river…We believe that the Indus was flowing not much if at all further from Mohenjodaro in its great days than it is now, and the long duration of the city's life implies a similar tenure of its general course by the river." (Lambrick, 1964: 80-1). The implication is that a possible shift of the river to the east led to the abandonment by the river of Mohenjodaro and consequent desiccation of the city.

Sarasvati flowed independent of Shatadru (Mature period of Kalibangan site)



"Sarasvati was a river independent of Shatadru. In R.gveda, it has been described as a mighty river and nowhere it has been stated that Shatadru joined it. It neither met Shatadru, nor did it flow along the Hakra-Nara course. Oldham (1886) was himself not much convinced, and in his map the connection has been *shown with broken lines. Sarasvati, according to us took a southwesterly swing near Anupgarh. The prevailing confusion in respect of the western extension of Sarasvati beyond Anupgarh, is due o the presence of the dry bed of Ghaggar, which further west is lost in the sands. Several workers have connected this dry channel with Hakra-Nara and envisaged that Sarasvati met Shatadru before flowing along this channel and thus they considered he Hakra-Nara to represent the ancient Sarasvati.

Southwesterly swing of Sarasvati at Anupgarh; LANDSAT image (1982) from Univ. of California, San Diego, obtained by Dr. S. Kalyanaraman; the black spots are near Suratgarh, northeast of Anupgarh, representing the formation of hard pans (gypsum and lime deposition) due to waterlogging.

"Broken channels shown by Bakliwal and Grove (1988) lying partially buried beneath the desert sands clearly establish the existence of a major drainage system, which in all probability was that of the ancient Sarasvati and its tributaries. Sarasvati appears to have taken a southwesterly turn near Anupgarh and thereafter flowed through the area now represented by the lakes around Jaisalmer (Mitha Rann, Kharia Rann, Kanodwala Rann and Kharawala Rann) and through Gadra Road and finally entered the Great Rann of Kach. It therefore, followed a course parallel to Shatadru (= Hakra, Eastern Nara). West of Barmer, it was met by a

major tributary, which also followed a course parallel to Sarasvati flowing through Bikaner, Pokhran and Barmer. Like Sarasvati, this major triutary was lost, although relict channels still exist. Ghose et al 1979 thought this river to be Sarasvati. There is a strong possibility that this unnamed tributary also originated in the Himalayan foothills...

"Drishadvati... Abundant references to it are found in the Vedic and Post-Vedic literature, and it has been stated that the area between Sarasvati to the north and Drisadvati to the south was named Bramhavarta and was the cradle of the Aryan civilisation. It was at Kurukshetra, in Bramhavarta, the famous battle of Mahabharata was fought. Though Drishadvati has been considered as a tributary of Sarasvati, however little has been said about the place where the two rivers met...

An overview of the ancient Sarasvati River Basin

"Tectonic activity has affected Western India as shown by uplifts and subsidences along two major fracture directions E-W and N-S. The former would include ENE-WSW, E-W and ESE-WNW while the latter comprised fractures along NNE-SSW, N-S and NNW-SSE directions. Evidences of movemens along these lineamen directions are recorded in the drainage changes in Gujarat (Merh and Chamyal, 1997; Sridhar et al 1977a, b) and in the continued seismicity of the region...

"In a monotonous, gradientless terrain along with the load of sediments which was brought by these rivers, the streams meadered widely over the plains. Secondly, it is not correct to believe that all the salt lakes spread over western Rajasthan represent fragments of disrupted old river channels. Some are structural depressions of which the Sambhar lake is a good example. The salt playas near Pokhran and Jaisalmer on the other hand typically belong to the former category. Both however have formed on account of tectonic activity spead over a long period.

"The eastern Nara-Hakra-Ghaggar river bed which is so prominently seen in the satellite images and topographic sheets definitely comprises the bed of an ancient major river. The question however is whether was it Sarasvati or Shatadru? There has been some controversy in respect of the confluence of Shatadru and Sarasvati. Whereas some have suggested that te Sarasvati was the trunk stream and Sutlej met it as a major tributary, others have given importance to the Shatadru suggesting that Sarasvati joined it.

“Depending on one's own convictions, the Ghaggar-Hakra-Nara channel has been variously taken as the old channel of Sarasvati or Shatadru. Whatever may be the case, there is little doubt that when Shatadru changed its course and joined Indus, its old cannel dried up. Even those who believed that Sarasvati was the main river and Sutlej was meeting it, attribute the drying up of the Sarasvati to the diversion of Sutlej waters. The ancient Sutlej (Shatadru) with its tributaries Beas (Vipas) and Ravi (Parasuni) of the Vedic period formed a distinct river system independent of Indus, and flowed into the Rann of Kach, east of Indus. Changes in the course of Beas and Ravi, its two tributaries also constitute important events of the disruption process. The picture in respect of the river Yamuna is also not clear. No doubt, there exist evidence to suggest that the river flowed south-westward prior to its eastward shift. But, what course this river followed during its southwestern flow is not fully understood. Geographically it is located far down south, and secondly, in our scriptures the Yamuna has been given equal importance along with the Sindhu and Sarasvati. Yamuna may have been a river independent of the Sarasvati.

"The question of the Vedic 'Drishadvati' a river supposed to be located south of the mythical Sarasvati has also remained unanswered. We know this river also originated in the foothills of the high HImalaya fed by glaciers and flowed across Rajasthan, but very little has been said about its lower course. Ancient texts state that it met Sarasvati, but its flowing directly into the Sea (Rann of Kach) has also been mentioned.

"The entire subject matter pertaining to the ancient drainage and its subsequent disruption has to be understood and explained by combining the description of the various rivers in the ancient texts from R.gveda to Mahabharata, with the existing river courses, alive as well as dead and the late Quaternary geological events of tectonism and climatic fluctuations. It has been found essential to critically analyse and interpret the description of the various rivers in Sanskrit literature and correlate it with the features seen in the survey of India topographical sheets, airphots and satellite images. This approach has been quite rewarding and we have ben able o a reasonable extent unravel the complex evolution of the drainage in the course of the last few thousand years. No doubt several grey areas and gaps in the knowledge still exist. Conclusive evidences are meagre, facts have got mixed up with myths and a clear chronology of events is still far from established. A multi-disciplinary study is needed...

"The Harappan sites located on Sarasvati far exceed in number those of the Indus Valley, and all along the ancient course of Sarasvati are encountered several major Harappan sites. These include not only those of Panjab and Rajasthan, but also of Gujarat and the famous Harappan port town of Dholavira and Lothal. In this context, we are inclined to agree with Radhakrishna (1998) and hazard to suggest that the (?urbanised and trade oriented) Indus Culture (3100-1900 BC) suceeded the earlier Vedic civilisation (6000-3000 BC). This revised chronology finds support in the evidence furnished by studies on palaeodrainage. Geoarchaeologists need to have a fresh look at this problem."
(Sridhar et al. 1999)

Sarasvati River Basin runs parallel to the Sindhu River Basin

Geographically, the sarasvatI basin can be traced to the currently known: ghaggar-nALI-hakDA-rainI-nArA-wAhindA-mihrAn-purAN channels. Ghaggar might have been a stream that rose in the Siwaliks and that joined the sarasvatI. This network runs parallel to the Indus across Sind. The river flowed from the Himalayas to the Rann of Kutch. [cf. Oldham, C.F., JRAS, 1893, p.49 on the Lost river of the Indian

desert; Sir A. Burnes, Memoir on the Eastern Branch of the River Indus, given an Account of the alterations produced on it by an earthquake, also a Theory of the formation of the Runn, Trans. RAS, III,1834, pp. 550-88].

Late Quaternary drainage disruption in Northwestern India: A Geo-archaeological Enigma

ABSTRACT



Figure 1 Dundkianwali, Mature Harappan period site submerged by drift sand (After Mughal, 1997, Pl. 15).

... The northern part of the Great Rann, comprises delta of just not one river (Indus/Nara) but also the site of three deltaic river mouths. The three deltas of the Great Rann relate to those of Proto-Shatadru (Hakra), Sarasvati and Drishadvati rivers. At present, only a part of the original delta complex has survived. In the western part, the dried up bed of Nara river is still well preserved. The eastern part however is less revealing as the original topography and channel features are considerably obliterated on account of aeolian activity. The southern limit of the delta-complex is marked by the raised mount of Allah Band, while to the north it abruptly abuts against the dune-fields of Thar. The southern as well as the northern limits are fault-controlled. The delta complex is indicated to be large, stretching westward up to Indus and eastward up to the mouth of the Luni river and extending southward up to the rocky Kutch mainland. The Banni plains form a part of this delta complex. The precise evolutionary history of the delta complex consisting of a period of deposition, formation of deltas and their subsequent disruption and dissection is not fully understood.

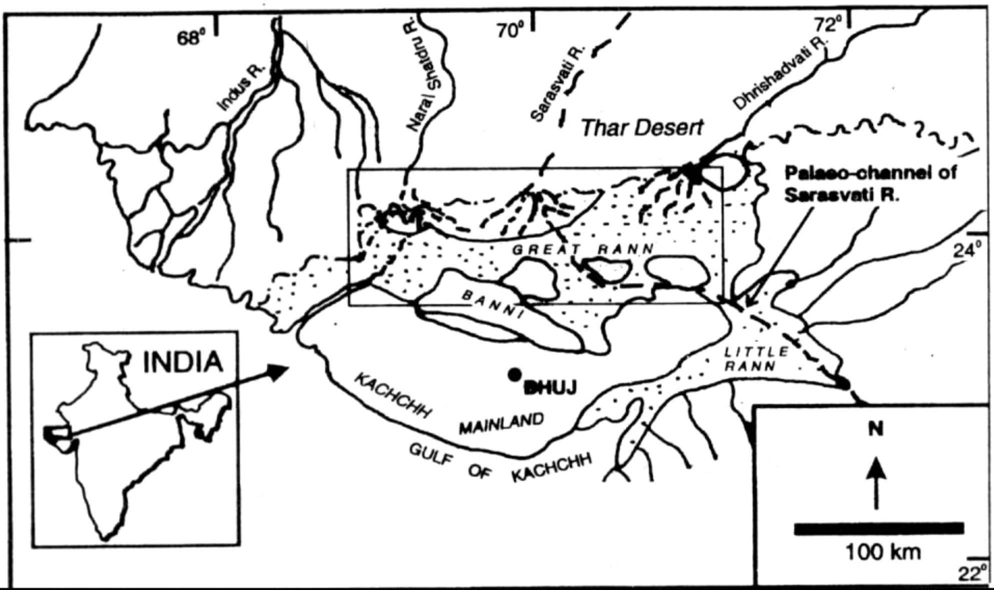


Fig. 1. Map showing major geomorphic units of Kach region and study area (Malik et al., 1999)

Major geomorphic units of Kutch area

"...Our studies have thrown new light on this ancient drainage and on the behaviour of various rivers in the past. We have, attempted in another paper (Sridhar et al., 1999) to reconstruct the courses of various lost rivers. We have envisaged four major independent rivers Sindhu, Shatadru, Sarasvati and Drishadvati finally meeting the sea quite close to one another (Fig. 2). These rivers were destroyed by tectonic upheavals and aridity. A succession of earthquakes appears to have progressively disrupted the original channels, and the sand cover of the Thar desert has obliterated them.

"The present day picture however still remains hazy. Very few earlier workers have

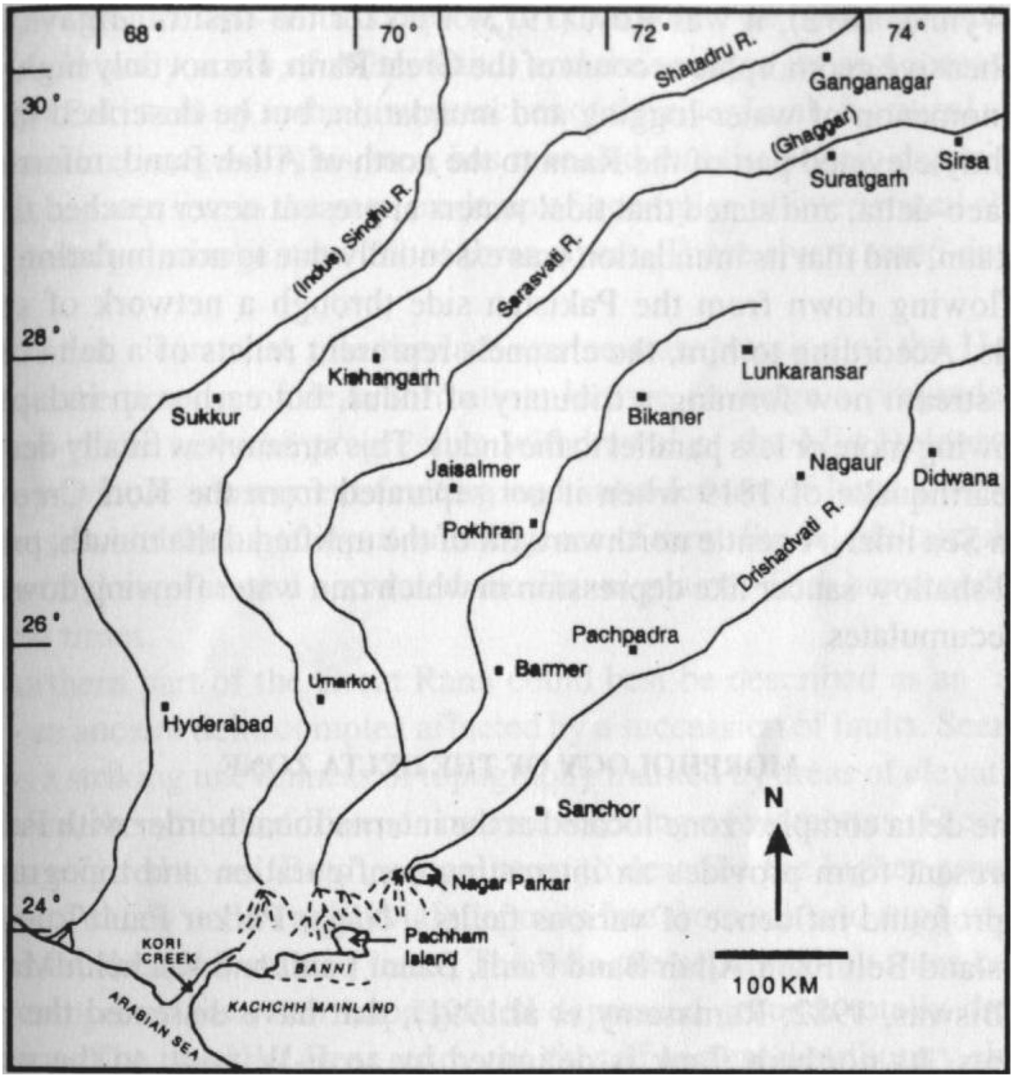


Fig. 2. Map showing ancient drainage network (after Sridhar et al., 1999)

furnished information on the lower courses and mouths of these rivers. Vague references have been made to Nara, now a tributary of Indus, originally an independent river of the past (?Sarasvati) meeting the sea along the existing Kori Creek (MacMurdo, 1824; Burnes, 1839; Oldham, 1883; Oldham 1886) and forming a delta near its mouth, which now forms the northern part of the Great Rann (Glennie and Evans, 1976; Roy, 1973). In the course of our recent investigations on the Great Rann of Kach, we have been able to throw new light on this part of the Rann, and establish that more than one river were involved in building up these deltaic deposits, and according to us the northern part of the Great Rann, comprises deltas of three rivers. By integrating our own observations with those generated for Rajasthan by Sridhar et al (1999), we visualise a complex delta system incorporating the mouths of the three rivers and relate their deltas with those of Proto-Shatadru (Hakra), Sarasvati and Drishadvati rivers.

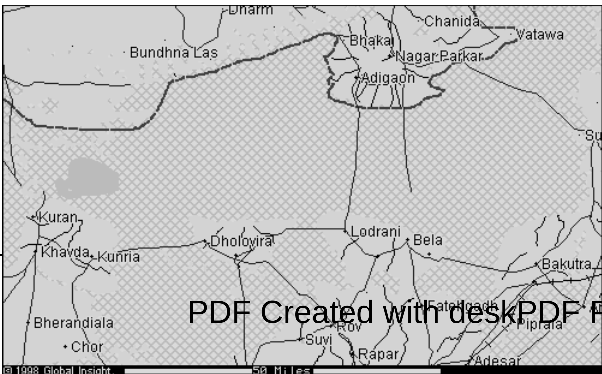
"Whereas, most of the earlier workers described the characteristics of the Great Rann and its northern fringes in general terms (Oldham, 1883; Burnes, 1839; Wynne, 1872), it was Roy (1973) who for the first time gave a very comprehensive geomorphic account of the Great Rann. He not only highlighted the phenomen of water-logging and inundation, but he described in detail the slightly elevated part of the Rann to the north of Allah Band, referred to it as a palaeo-delta, and stated that tidal waters at present never reached this part of the Rann, and that its inundation was essentially due to accumulation of rain water flowing down from the Pakistan side through a network of shallow channels. According to him, the channels represent relics of a delta of Nara river, a stream now forming a tributary of Indus, but earlier an independent flowing more or less parallel to the Indus. This stream was finally destroyed in the earthquake of 1819 when it got separated from the Kori Creek-- an Arabian Sea inlet. A gentle northward tilt of the uplifted delta mlouth, provides an ideal shallow saucer like depression in which rain water flowing down from north accumulates.

Morphology of the delta zone

Map showing Nagar Parkar in reference to Dholavira, an archaeological site of the civilization in the Rann of Kach.

"The delta complex zone located at the international border with Pakistan in its present form provides an interesting configuration and topography. It shows profound influence of various faults -- Nagar Parkar Fault/Luni-Sukri Fault, Island Belt Fault/Allah Band Fault, Banni Fault and KutchMainland Fault (Biswas, 1982; Ramasamy et al. 1991), that have dissected the deltaic sediments. Its northern flank is delimited by an E-W fault, to the north of which, these deposits abut abruptly against the sands of the Thar desert, showing a distinct marking linear contact between the dune field and the Rann area. This tectonic lineament shows signatures of reactivation during Pleistocene and is also well evidenced by frequent seismicity (Ramasamy et al. 1991). A large part of the delt forms a more or less semi-circular terrain bounded to the south by a curvilinear system of faults which separate it from the deeper parts of the Rann, which come under tidal inundation. This truncation is obviously due to a number of fault related geomorphic changes, which affected the then existing delta complex, uplifted and tilted parts of it northward and pushed below a substantial part of it beneath the shallow sea.

"Roy (1973), has given a good description of the surface of the relict delta complex; he has recognised numerous elevated mounds and ridges separated by ancient channels and has called these inter-channel areas as 'Bets' and designated the entire ancient deltai deposits as 'Bet Zone'. When Roy carried out his studies in the seventies, he did not have the advantage of the satellite images and had to work on the basis of toposheets and air-photos only. He prepared a map of the Bet zone showing the main Nara channel and its distributaries. With the advantage of satellite images, we have now significantly improved upon the map prepared by Roy (1973). Considering the regional



geomorphology and drainage characteristics to the east and north, we are now in a better position to provide greater details and also comment upon the genesis and evolution of the palaeo-delta-complex. In our studies, we have included Roy's Bet zone (broadly north of Allah Band) and the areas to its east across Nagar Parkar (of Pakistan) up to the lower reaches of the river Luni. A critical analysis of the satellite images of this area, has revealed that the deltaic deposits were much more extensive in the past, made of a complex of intertwined channels or distributary drainage network of three rivers. These rivers stand destroyed today...

"Northern part of the Great Rann could best be described as an 'alluvial scarp' -- an ancient delta complex affected by a succession of faults. Seen today, it shows a strikign unevenness of topography marked by areas of elevation and depression, the altitude difference never exceeding a few metres. The elevated portions referred to as 'Bets', a local term to describe the higher ground, are made up of sandy and silty (fluvial) deposits free from salt and support growth of grass, bushes and stunted trees. The bets are separated by inter-bet areas which comprise linear salt impregnated depressed ground, totally devoid of vegetation. The inter-bet areas represent sites of ancient distributary channels, whereas the bets are the remnants of the river mouth deposits, dissected by these channels. Roy (1973) has given a good description of the various bets, which according to him represented 'channel bars'. At times they attain heights of as much as 4m to 5m. This contrasting topography is ideally recognised during monsoon when the area gets flooded by rain water that flows down from the north and acumulate3s in the more or less flat inter-bet depressions.

"At present, only a part of the original delta complex is seen to have survived. In the western part, the dried up bed of Nara river is still well preserved. The eastern part however is less revealing, the original topography and channel features having been considerably obliterated on account of aeolian activity... We have however been able to generate more information (mainly because of the availability of satellte imagery) and are in a better position to unravel the network of bets and inter-bet areas and thereby recognise the existence of one more delta to the east of Nara (Fig.3).

”The southern as well as the northern limits of the delta complex are fault

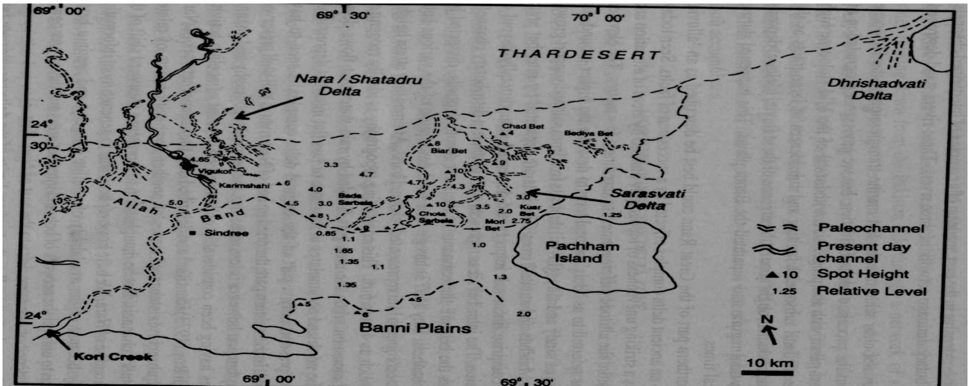
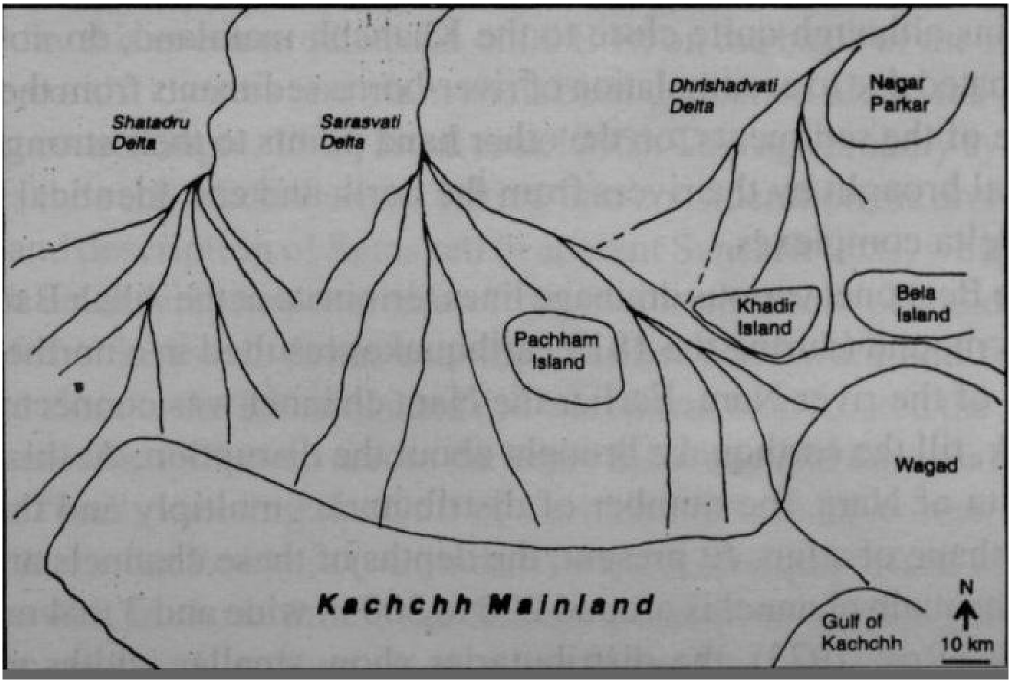


Fig.3. Map showing the bird's foot palaeo-delta complex representing the mouths of three major rivers Shatadru (Hakra), Sarasvati and Drishadvati rivers. The spot heights are in metres.

controlled. The southern flan is marked by a raised mound (Allah Band) while to the north it abruptly abuts against the dune fields of Thar. Old courses of major streams and their distributaries are reasonably well preserved and are observed in the field, and on air-photos and satellite imagery. The delta mouth palaeochannels "inter-bets" show braided distributary drainage network separated by sandy islands and braid bars ("bets"). The small inter-tidal channels flowing SW, S and SE are seen abruptly truncated by the curvilinear scarp of Allah Band (Fig. 3).

"We envisage that originally, the delta complex was areally quite large, stretching westward up to Indus, eastward right up to the mouth of the Luni river and extending southward 40-50 km up to the rocky KutchMainland (Fig. 4a). In fact, the Banni plains form a part of the delta complex and were connected with the Bet-zone, forming the souther part of the river-mouth deposits. The present day Banni forms a low alluvial tableland rising 3m to 12m above m.s.l., but its general relief is



about 1m (Kar, 1993). The plains comprise mainly laminated silty-sand and clay lenses, similar to those of the Bet Zone (Merh and Patel, 1988; Roy and Merh, 1977). Fault-related subsidenes are invoked for the separation of Banni and submergence of the southern part of the delta complex beneath a shallow sea inlet.

Schematic map showing formation and deposition of the delta complex at around 4 ka with gradual withdrawal of high sea of the Mid Holocene (6 to 4 ka) by three major rivers that extended upto the KutchMainland

Schematic maps showing (b) major lineaments that played vital role in dissection of palaeo-deltas and disruption of rivers at around 3.5 ka to 3.0 ka (c) formation of shallow depression resulting into transgression of sea, detachment of Banni and further dissection of deltas at aroud 2.5 ka (d) uplifted delta-plain area (Bet Zone), Banni plains and extended course of Shatadru (Nara) flowing through 'Kori Creek' into Arabian Sea, which was destroyed during 1819 Allah Band earthquake.

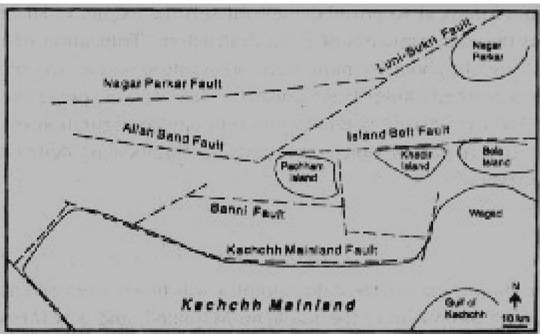


Fig.4b. Schematic map showing major lineaments that played vital role in dissection of palaeo-deltas and disruption of rivers at around 3.5 ka to 3.0 ka.

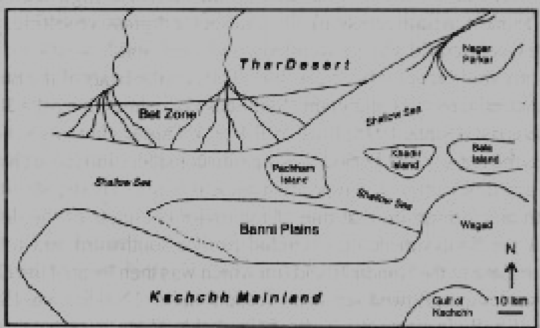


Fig.4c. Schematic map showing formation of shallow depression resulting into transgression of sea, detachment of Banni and further dissection of deltas at around 2.5 ka.

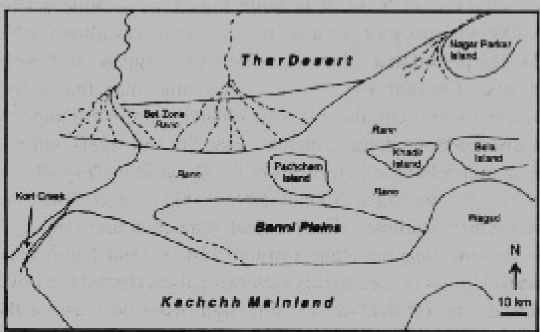


Fig.4d. Schematic map showing uplifted delta plain area (Bet Zone), Banni plains and extended course of Shatadru (Nara) flowing through "Kori creek" into Arabian Sea, which was destroyed during 1819 Allah Band earthquake.

"Existence of relicts of yet another delta is clearly recorded further east near the western flank of the Nagar Parkar Hill. This delta, is more or less fragmentary. When tranced north-eastward, it clearly joins up with the relict channel of a river which could have been connected to Sukri, a branch of Luni. Perhaps this was a major river (?Drishadvati) of the past, and its delta lies beneath the salt-encrusted wasteland....

"Bet deposits consist mainly of fluvial material predominantly with some sand, silt and clay. Sediments in the inter-bet areas (abandoned distribuaries) are channel-fill deposits essentially fine-grained and quite often characterised by laminations, each laminatio indicating a single cycle of deposition and at places show lenses of molluscan shells. The individual laminations are seen composed of two layers, one silty and the other rich in clays. Sediments contain abundant biotite, muscovite, hornblende, tourmaline, zircon and rutile. Obviously, presence of these minerals is typical of a schistose and gneissic terrain, a fact strongly suggesting a Himalayan provenance. The branched drainage nework and near total absence of coarser sediment fractions, indicate very low energy, pointing to a loss of load carrying capacity of the rivers. This is attributed to a very low gradient near the mouths, giving rise to deposition of fine-grained deltaic sediments. The Banni plains are also made up of laminaed fine silty-sands and clays similar to that of the Bet Zone area. Interestingly the Banni plains although quite close to the Kutchmainland, do not appear to have originated due to accumulation of river-borne sediments from the mainland. The nature of the sediments, on the other hand points to their strong affinit to the material brought by the rivers from the north and east identical to those of northern delta complexes.

"In the Bet zone, various drainage lines terminate at the Allah Band. Sudden rise of this mound (during the 1819 earthquake) resulted in a northerly tilt and truncation of the river Nara. Earlier the Nara channel was connected with the Kori Creek, till the earthquake brought about the disruption (Fig.3). At this site of the palaeo-delta of Nara, the number of distributaries multiply and these spead out in the shape of a fa. At present, the depths of these channels are variable. Whereas the main channel

is around 200 to 300 m wide and 3 to 4m deep with steep walls (Roy, 1973), the distributaries show smaller widths and 1m to 1.5m depths, but mostly filled up by wind blown material.

"The eastern half of the ground forms a delta of another river. Its trunk stream is not as conspicuous as Nara (because of the sand cover) but the overall fan-shaped distributary channel network marked by 'bets' and 'inte-bet' depressions clearly points to a river mouth. Further east, the alluvial deposis are abruptly truncated by a fault. But there is little doubt about the eastern extension of the delta-complex joining up with the mouth of the river which flows into the Great Rann just west of the Nagar Parkar Hill. The poorly preserved easternmost delta, at some point of time in the ancient past must have been as well developed as those seen on the Allah Band mound. We envisage several events of faulting, the 1819 earthquake being one of them...

"It is quite logical to postulate several seismic events in succession, to account for the entire process of delta destruction. Truncation of numerous rivers was brought about by more than one faulting event accompanied by uplift, subsidence and tilting. This neotectonic activity was spread over a period of at least 3500 years giving rise to the present day configuration of the Great Rann, the northern part of which represents the fragmentary delta complex of the ancient rivers.

Evolution of the delta complex

"As mentioned earlier, the delta complex was much more extensive in the past, stretching almost upto the KutchMainland, and was formed by the accumulation of sediments brought by at least three major rivers from the north (Fig. 4a). We invoke a progressive build up of the fluvio-marine to fluvial sediments pari passu with the gradual withdrawal of the high sea of the Mid Holocene (Flandrian transgression). Only in such a regressive setting, the deltas of various rivers could have extended south and south-westward. We can tentatively fix his event to date back 4000 B.P., on the basis of the radiometric ages of the corals, oysters and clam shell beds deposited along the Saurashtra and Gujarat coast (Gupta, 1975; Juyal et al. 1995)... Taking into consideration the archaeological evidences and description of Sarasvati in ancient texts, we are inclined to put forth an assumption that one of the maor channels of the distributary network of the Sarasvati delta, extended further southward and following a course quite close to the Khadir Island (on which was then located the Dholavira-Harappan settlement) flowed across the Little Rann and Nal Sarovar (Saurashtra depression, finally meeting the Gulf of Cambay).

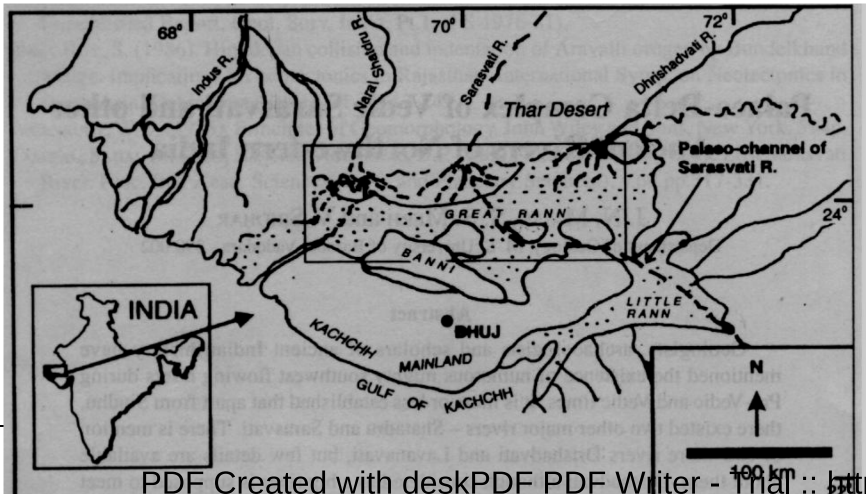
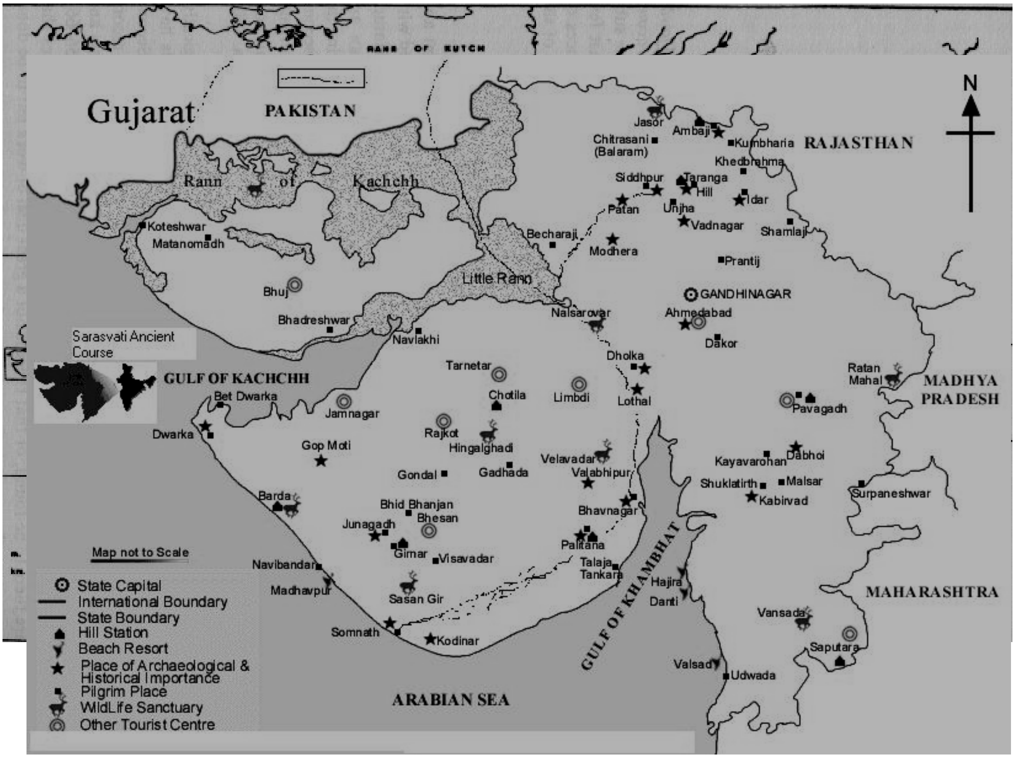


Fig. 1. Map showing major geomorphic units of Kach region and study area (Malik et al., 1999)

Archaeological sites in Kutch; Sarasvati River course in Gujarat beyond Little Rann



Archaeological sites in Rann of Kutch and Saurashtra

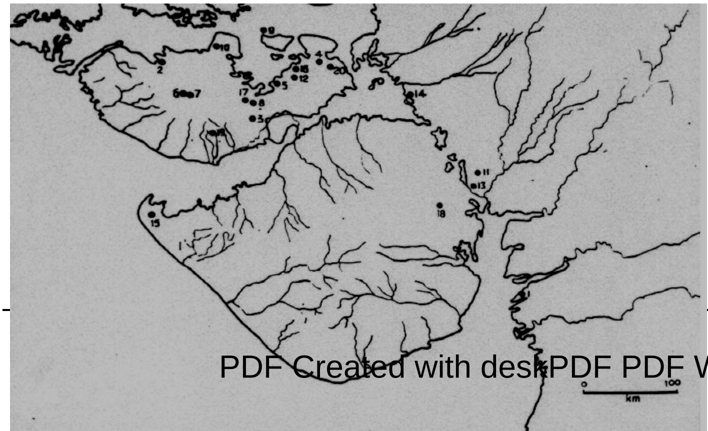
Maps of Rann of Kutch and Saurashtra (Gujarat) showing Dholavira, Surkotada, Rangapura, Lothal and the Nal Sarovar [Note the palaeo-channel of Sarasvati R. entering through the Little Rann, Fig.1]. This channel could have linked with the Nal Sarovar and flowed beyond the Sarovar, explaining the observations of Alex

Rogers.

Gujarat: Mature and Late Harappan Settlements

Gujarat; Late Harappan settlements, mainly short-term camps, in the black-cotton soil of Saurashtra (152 sites as compared with 20 in the Mature Harappan period). Gujarat; distribution of Mature Harappansettlements; 1. Bhagatrav; 2. Desalpur; 3. Jhangar; 4. Kesari; 5. Khari ka Khanda; . Kotada Bhadli-II; 7. Kotada Bhadli-III; 8. Kotada; 9. Kotadi (Dholavira); 10. Kotara (Juni-Kuvan); 11. Koth; 12. Lakhapur; 13. Lothal (3740 BP); 14. Nagwada-I (370 BP); 15. Nageswar; 16. Pabumath; 17. Pirwada (Khetar); 18. Rangpur; 19. Samagogha; 20. Surkotada (3645 BP).

"A review of the regional archaeological assemblages indicates a cultural continuity, without stratigraphic break, demonstrating that the Harappan culture did not end abruptly, as was thought earlier (Possehl, Gregory L., Indus Valley Civilization in Saurashtra, New Delhi). Nevertheless, there was a change during the second millennium BC that led to the abandonment of cities like Mohenjodaro, Harappa, Lothal and many other Harappan sites. In Gujarat, the settlements of the Mature Harappan phase are few and far between compared to the large number of settlements of later phases... the settlements at Nageswar, Lothal and the sites in Kutch amply demonstrate that the settlements were developed mainly for trade and access to raw



materials or to facilitate administration rathern than simply subsistence activities. The expansionist tendency on the part of Harappans towards resource areas is further substantiated by the discovery of Shortugai in the lapis lazuli producing region of northern Afghanistan (Frankfort, H.P. and M.H. Pottier, 1978, Sondage preliminaire sur l'establishment protohistorique Harappeen et Post-Harappeen de Shortagai, *Arts Asiatique*, 34: pp. 28-85)." (Kuldeep K. Bhan, Late Harappan Settlements of Western India, with specific reference to Gujarat, pp. 219-234 in: *Wisconsin Archaeological Reports* 2, 1989).

Alluvium from a Great River in the Gulf of Khambat

Alex Rogers, 1870. A few remarks on the Geology of the country surrounding the Gulf of Cambay in Western India, Quarterly Journal of Geological Society of London, 26: 118-124 who was perhaps among the earliest observers of the geology of the Gulf of Cambay (close to Lothal), points out that from the geological formation of the country bordering on the Rann, it appeared that the drainage of the PanjAb once flowed into it:

`` ... The rapid silting up of the Gulf of Cambay gives particular interest to an inquiry into the geological conditions which probably shaped it in remote ages ... (The head of the Gulf) comprises within itself te Great Runn of Kutch ... primary or metamorphic rocks are traceable in its immediate vicinity only in a small tract on its west coast ... even the highest points of the granite peaks show signs of weathering, and probably also of the erosive action of waves ...

Many considerations point to the existence in former ages of some large river flowing down from the north, and falling into the Indian Ocean somewhere in the position of the present Gulf of Cambay: and it is not improbable that that river may have been the Indus. It may have been that the original course of the Indus from the Punjab was in a more south-easterly direction than that of the present day ... (In this Gulf), coinciding to a large extent with the black-soil belt, there can be clearly traced a natural depression in the surface of the country for some twenty miles from

the head of the Gulf, terminating in a shallow lake of brackish water called the Null ...

Shells of the genus *cerithium*, an estuarine form, are found lying loose in the black soil many miles from this point (Bhogava); and the records of the old Revenue Survey of Goozerat state that there were formerly found in the Null large stones with holes through them, which had evidently served as anchors for boats of some size ... [cf. the ring stones found in Mohenjo-daro] ... there is historical and well-known proof of the alteration of the level of the larger of these salt flats as the consequence of an earthquake in AD 1819 ... only a much more violent action would have separated the laterites of the high and low levels ... this rock, again, appears at precisely the same level on the opposite sides of valleys in the Concan and Deccan, giving ample proof of dunudation ... at the time (some of the Vedas) were composed, the Suruswuttee, the most easterly of the Punjab rivers, which now loses itsels in the desert of Rajpootana, flowed into the Indian Ocean. This confirms to come extent the theory of the case of the alluvial deposit at the head of the Gulf of Cambay."

There have been references in Sanskrit texts that Prabhasa (= Somnath) was located quite close to the mouth of the Sarasvati. In those times, the Shatadru was flowing along the channel, which later survived as Nara. It is quite logical to assume a situation for Sarasvati ~4000 years ago, more or less similar to that prevailing for Nara as late as 1819 A.D. The period that followed (~3500 years) appears to have been quite crucial, because it was in the course of this time span that a sequence of neotectonic events brough about drastic changes in the drainage systems of NW India, disrupted the delta complex of the ancient figures and gave rise to the existing geomorphic characteristics of the Great Rann (Fig. 4b, c). A major tectonic upheaval is envisaged around 3500 to 3000 years ago (Sridhar et al. 1994, 1999) which disrupted the rivers of Rajasthan and Gujarat.

“Shatadru which was flowing into the Rann through Hakra, (and Nara) was diverted towards Indus. Uplifts related to this tectonism also affected he lower

courses of the Sarasvati and Drishadvati causing significant decrease in the low of water, and the capacity of the sediment transport of these rivers adversely affected the mouths of these rivers. It is difficult to visualise what exact tectonic changes took place in the delta zone itself, but there is a strong likelihood that deformation of the sediments, through rupuring and flexuring brought about uplift and subsidence. We cannot conclusively envisage as to when the Banni area got separated from the Bet-zone, but there is little doubt that a shallow sea occupied a large part of the Rann around 2.5 ka (Fig. 4c, d). Perhaps an arm of this sea also intervened between the Banni and the Kutchmainland...

"In the absence of conclusive surface and subsurface evidences, and dependable chronological data we have ventured to reconstruct an evolutionary history, which attempts at explaining logically the observed depositional and neotectonic features in and around delta complex zone. To a considerable extent, help has been taken from the historical accounts of the various travellers who visited this part of the subcontinent in the course of last several centuries. We are quite aware of the pitfalls of integrating such subjective descriptions with observed facts, but placed in a situation where authentic scientific description is scanty, the endeavour itself is worthwhile and could at least provide a starting point for future work..." (Malik et al., 1999)

Was Lothal reached through the Little Rann and the Nal Lake?

The Rann of Kutch was navigable in the third and second millennia B.C. “It is likely that the Harappans sailed down the Nara, entered the Rann, and moving along the western and southern coasts of Kutch and Kathiawar reached the Gulf of Cambay. It is suggested by some scholars that Lothal was reached through the Little Rann and the Nal Lake which were then easily navigable.... Around the head of

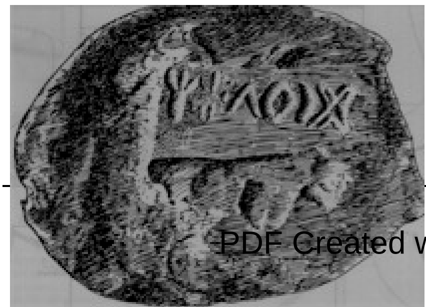


the Gulf of 15 Cambay the ancient channels of the rivers, which are now silted up, act as drains for springtides, but otherwise remain a salt marsh.”(S.R.Rao, 1979). During the monsoon, the lower part of the Rann of Cambay joins the Nal Lake forming a connected sheet of water which spreads over the neighbouring tracts of Bhàl and the Nalkàntha, turning the villages into islands and cutting off communication with Ahmedabad (Imperial Gazetteer of India, Bombay Presidency, Calcutta, 1901, II, p. 348).

Mohenjo-daro was on the banks of the Mohenjo-daro was on the banks of the Sarasvati river Sarasvati river Marshall's report (1931, pp.1-6) which includes a superb map, reads thus: "(Mohenjo-daro) stands on what is known locally as "The Island"-- a long, narrow strip of land between the main river bed and the Western Nara loop, its precise position being 27.19N by 68.8E, some 7 miles by road from Dokri on NW Railway, and 25 from Larkana town... Twelve centuries ago, when the Arabs first came to Sind, there were two great rivers flowing through the land: to the west, the Indus; to the east, the Great Mihran, also known as the Hakra or Wahindah. Of these two rivers the eastern one seems to have been the more important...Major Raverty, the foremost authority on the subject, concluded that at the time of the Arab invasion the main channel of the Great Mihran flowed a line roughly coincident with the existing Eastern Nara canal, which was once an important river bed (i.e. it passed close by the city of Alor...flowed...west of Umarkot, and so the Rann of Kutch (then an estuary of the sea) and by the Kori creek to the Arabian Sea. cf. Raverty, 'The Mihran of Sind and its tributaries' JASB, Vol. LXI, 1892, pp. 156-508). According to him, the terminal course of the Indus, which flows by Mohenjo-daro, was then a subsidiary branch of the Mihran, but its course was not the same as at present...the existence of two important Chalcolithic sites of Mohenjo-daro and Jhukar, the one in the near vicinity of the Indus, the other of the Western Nara loop..." Griffin Vyse recalls observations that Alexander the Great had also sailed to the great lake and to the sea by this 'eastern branch of the Indus'..."the eastern or greater arm of the Mikran described by Rashid-ud-deen as branching off from above Mansura to the east, to the borders of Kutch, and known by the name of Sindh Sagara (Elliot, vol. i, p. 49). This ancient

river is also identical with the Sankra Nala which was constituted by Nadir Shah the boundary between his dominions and those of the Emperor of Delhi." Now it can be seen that Mohenjo-daro was also on the banks of one of the channels of Sarasvati, what is now called the Western Nara loop. With Harappa located on Ravi, accessible to Kalibangan, the locus of the civilization shifts to the banks of the Sarasvati river. Kalibangan was located at the junction of the Sarasvati with Drishadvati confirming that the river was a perennial stream when the site was occupied (ca. 3200-2000 BC). Some Bronze Age archaeological sites have been found located within the bed of the Drishadvati river. (Francfort, H.P., 1992, Evidence for Harappan irrigation in Haryana and Rajasthan. The *Eastern Anthropologist*, 45 (1-2): 87-103) indicating the possibility that the drying-up of the Sarasvati occurred during the later phases of the Mature Harappan culture.

Chalcolithic Sites. Little Rann of Kutch. (After Possehl, 1999, Fig. 4.109). The Anarta Chalcolithic ware (Pre-2500 BC; some radiocarbon dates at Choteria Timbo, Loteshwar etc. are: 3346, 3499, 3969, 3705, 4210 BC) is Gritty Red, also accompanied by Fine Red ware, burnished red ware and burnished grey/black ware. Anarta Chalcolithic ceramics are referred to as the Gujarati type Mature Harappan wares and Lustrous Red ware, a ceramic of the second millennium BC (Sonawane, V.H., and Ajithprasad, P., 1994, Harappa culture and Gujarat. *Man and Environment*, 19(1-2): 129-39).Possehl notes that the Pre-Prabhas (ca. 3000 BC) ceramics from Somnath have typological parallels with the Anarta Chalcolithic. (Dhavalikar, M.K., and Possehl, G.L., 1992, The Pre-Harappan period at Prabhas Patan and the Pre-Harappan Phase in Gujarat. *Man and Environment*, 17(1): 71-8). Possehl also notes Surkotada (2500 to 1900 BC) and Dholavira (on Kadir island in Rann of Kutch, also called Kotada—large fort) provide the links of this region with Sind and Baluchistan and movement into and across the Ranns in prehistoric times, particularly since Surkotada is close to the estuaries of the Beas, Rupen and Sarasvati Rivers (Possehl, G.L., 1999, p. 599).



Nagwada. Seal impression. (After Hegde, Sonawane, Bhan, Prasad and Krishnan, 1990, Excavation at Nagwada—1987-88: a preliminary report. In, N.C. Ghosh and S. Chakrabarti, eds., *Adaptation and Other Essays: Proceedings of the archaeology conference, 1988*. Santiniketan: Visva-Bharati Research Publications: 191-195: Pl. 6) Nagwada is a site on the estuary of the Rupen River with Mature Harappan material and yielded an impression of a stamp seal with a bovine animal.

Sindhu-sàgara and the Rann of Kutch

The observations of Raverty are as follows: " Hakra... appears to be the modified form of Sagara, the letter S being pronounced H in Rajputana and Sindh... Sagar is the Sanskrit for 'ocean', 'sea' etc., and it is still known as the Sind-Sagar near the sea coast. Tod calls it 'Sankra', which is another form of the name; and it is called Sankgrah in the treaty entered into by Nadir Shah, and Muhammad Shah, Badshah of Dihli, when ceding all the territory west of it to the Persians... Hakra once did run through the so-called 'Indian Desert'... Ghag-gar, the Sursuti and the Chautang were the tributaries of Sind-Sagar or Wahindah or Hakra... Mansuriyat... this city is situated among the branches of the Mihran river, and from that place the river unites with the ocean by two channels. One is near the town of Loharanj, and the other bends round towards the east in the confines of Kaj (Kutchch) and is called the Sind Shakar (Sind-Sagarah) which means The Sea of Sind. The river Sarasat unites with the ocean to the east of Suminath. This last named river is, of course, the Sarasvati, which falls into the sea near Pattan Som-nath, not the classical river, the tributary of the Ghag-gar, described further on, the sacred river of the Brahmans... At Thatha the Sind is called Mihran..."

Sarasvati flowed into the sa_gara in the Gulf of Khambat

``Evidence from many sources, including that of archaeological remains associated with old river courses, indicates that a major river, stemming mainly from the same sources as the present Sutlej, flowed through Northern Rajasthan, Bahawalpur and Sind-- to the southeast of the present course of the Sutlej and the Indus -- in the

third to second millennium BC. This river, known as the Sarasvati in its upper course, at different times either joined the lower course of the Indus in Sind, or found its way independently into the Arabian Sea via Rann of Kutch." (Allchin, B., Goudie, A., and Hegde, K., 1978).

Cholistan or Rohi Desert: continuation of the Thar (Marusthali), the Cholistan or Rohi Desert: continuation of the Thar (Marusthali), the Great Indian desert Great Indian desert Pakistan's Department of Archaeology and Museums has announced a major and spectacular discovery of 414 protohistoric settlement sites of a civilization dated to a continuous sequence from circa fourth millennium B.C. to the first millennium B.C., after an extensive survey of 300 miles of the dry bed of the Hakra (Ghaggar) river, within an approximately 10 to 15-mile-wide strip (Mughal, M.R., 1980). The survey was conducted over four seasons between 1974 and 1977. The civilization sites were found concentrated around Fort Derawar and to its southwest in the Cholistan desert of former Bahawalpur state in river valley of Hakra (Ghaggar). Mughal classifies the 414 sites as follows (Some sites have more than one cultural phase).

Fourth millennium B.C.: Hakra wares (Jalilpur related): 99 sites Animal figurines, shell and terracotta bangles, grinding-stone fragments, bits of copper and a great number of other implements. Early third millennium B.C.: Early Harappan (Kot Diji related): 40 sites 35 percent of the sites combine residential functions with specialized/industrial activities; Gamanwala spreads over an area of 27.3 hectares (half the size of Harappa 65 hectares or 160.6 acres; Jalwali spreads over 22.5 hectares.

Mid and late third millennium B.C.: Mature Harappan (Mohenjodaro and Harappan related): 174 sites Sites shift from the northeast to the southwest, around and beyond Derawar fort; Ganweriwala is 81.5 hectares in area (comparable to Mohenjodaro: ca. 83 hectares and larger than Harappa: ca. 65 hectares); about 45.4 percent of the sites are industrial sites clearly separated from habitation areas: firing of pottery, bricks, small terracotta objects, glazed faience objects and melting of

copper. Ganweriwala has an elevated 'citadel' close to a larger lower town (residential). This place, midway between Mohenjodaro and Harappa would appear to have drawn on the mineral resources of Rajasthan (perhaps, the Ganeshwar copper mines).

Early second millennium B.C. and later: Late Harappan (Cemetery H related): 50 sites These sites are concentrated in the same area as the Mature Harappan sites. Industrial sites account for only 18 percent of the total sites. End second and early first millennium B.C. (Post or non-Harappan, painted grey and black-and-red wares related):14 sites.

All sites (with the exception of Satwali covering 13.7 hectares) are located on the former Hakra river bed. The painted grey ware, claimed to be a continuum from the Harappan tradition, is reported from 320 sites in India located in northern Rajasthan, Haryana , the Punjab and western Uttar Pradesh (Tripathi, Vibha, 1975, The Painted Grey Ware: An Iron Age culture of northern India, Delhi, Concept Publishers).

Mughal concludes: "On the Pakistan side, archaeological evidence now available overwhelmingly affirms that the Hakra was a perennial river through all its course in Bahawalpur during the fourth millennium B.C. (Hakra period) and the early third millennium B.C. (Early Harappan period). About the middle of the third millennium B.C., the water supply in the northeastern portion of Hakra, roughly between Fort Abbas and Yazman (near Kudwala) was considerably diminished or cut-off. But, abundant water in the lower (southwestern part) of this stream was still available, apparently through a channel from the Sutlej; this is attested by the heavy clustering of sites in that area during the late third and early second millennium B.C. (Mature and Late Harappan periods respectively). About the end of the second, or not later than the beginning of the first millennium B.C., the entire course of the Hakra seems to have dried up and a physical environment similar to that of present day in Cholistan set in. This forced the people to abandon most of the Hakra flood plain. A few Painted Grey Ware settlements, most of them smaller

than four hectares in size, are located along the upper part of the Hakra river. These were sustained by a meager water supply reaching there with seasonal regularity from the Ghaggar… the presence of Hakra Ware sites on top of old, reddish-brown sand, as observed on the south and southwest of Derawar, would seem to indicate that the Cholistan part of the Thar desert had already advanced close to Derawar prior to the fourth millennium B.C.” (Mughal, M. Rafique, 1982).

This area was not explored earlier during the surveys conducted by Aurel Stein in 1941 (Stein, Aurel, 1942). The desert contiguous to the Cholistan desert is called the Rajputana desert which was surveyed by A. Ghosh (1952). The area near Anupgarh and Nohar on the Ghaggar river was noted by Katy F. (1980).

Sites along Sarasvati River surveyed by Aurel Stein; sketch map

“The Ghaggar and its several affluents rise as torrent beds in the Siwaliks that fringe the outermost of the Himalayan ranges. After passing down to the Ambala district, they soon cease to be perennial streams. The easternmost, still known as the Sasruti (the Hindi derivative of Sarasvati), passes the sacred sites of Kurukshetra near Thanesar, a place of Hindu pilgrimage.it is for the most part of the year only a modest rivulet. Further down, some 50 miles below the town of Ambala, when the Ghaggar has gathered all its tributaries and has entered Patiala territory, it flows in its wide sandy bed for only some months. Where it approaches the Bikaner border, after passing through Patiala territory and the western portion of the Hissar district, the reservoir of Out was constructed some forty years ago, with a weir to hold up flood water for feeding two small canals in Bikaner territory...

“The area thus irrigated down to near the small town of Hanumangarh forms even in good years but a smaller portion of the land shown by revenue records as cultivable within the Tahsil; what little water is left in the Ghaggar itselkf suffices only for a still smaller portion of groun in its bed. It flow has stopped in most years above Hanumangarh; rarely is it known to have extended so far as 16 miles below. The sketch-map based on the latest survey shows how great is the contrast between the very scanty volume of water brought down by the Ghaggar and the width of its dry bed within Bikaner territory; over more than 100 miles it is nowhere less than 2 miles and in places 4 miles or more. This bed is lined on both sides by dunes varying in height but gathered into continuous lands or ridges. Seen from a distance these might suggest river banks, but they show no marks of erosion...

“The wind-borne sand from adjacent deserts is stopped by the vegetation growing in riverine belts once reached by seasonal inundation...Taking first the Ghaggar bed above Hanumangarh, one notes that the number of mounds marking ancient sites long abandoned is here distinctly smaller than farther down the old river bed. Such mounds, known locally by the terms ther or their (in the case of the smaller ones) are bare of all vegetation and covered with pieces of broken pottery; these mark prolonged occupation before the sites were abandoned...Such mounds are more numerous lower down the Ghaggar than near and above Hanumangarh, and also, I have reason to believe, farther up within the Hissar district...Some 4 miles to the east of Hanumangarh lies the mound of Bhadrakali, called after a Hindu shrine standing at its eastern end and attesting here as usual ‘continuity of local worship’. The mound measures fully 300 yards long and rises to some 43 feet above the surrounding ground which, owing to occasional flooding from the Nali and thanks to intelligent protection, still bears thin tree growth. Here painted sherds of the early historical type could be picked up in plenty on the surface. At Fattehgarh to the south-east of the mound which, though extensively dug into for manuring earth and for saltpeter, still rises on its crest to 47 feet, displays the same early painted ware both on its surface and deep down in layers exposed by these diggings. The great difference in levels affords proof of the prolonged period during which that ceramic type prevailed...For some 30- miles upto the Sandahanawala mound these

sites of prehistoric occupation are interspersed with other mounds generally smaller and much lower...

“Some eighteen mounds were examined over an area close on 100 square miles...The great height and size of several thers indicate prolonged settlement. Thus the conspicuous mound of Kudwala rises to more than 50 feet and has a length of close on three-quarters of a mile. The mound of Lurewala, some 9 miles farther west, though somewhat lower, is larger...That is the great mound close to the much-restored fort of Derawar which from medieval down to modern times was a stronghold of those who ruled the desert now divided between Bahawalpur, Bikaner and Jaisalmer. It was one of the border posts of the old caravan route along the Hakra.”(After Stein, Aurel, 1942, A survey of ancient sites along the ‘lost’ Sarasvati River, in: *Geography Journal* 99: 173-182.)

"[SarasvatI] flows down past Patiala to lose itself in the northern part of the desert of Rajputana at some distance from Sirsaa. Manu applies the name of Vinasana to the place where it dispappears from view. In the Siddha_nta-s’iroman.i (Gola_dhya_ya, Bhuvanakos’a), the Sarasvatii is correctly described as a river, which is visible in one place and invisible in another. It disappears for a time in the sand near the village of Chalaur and reappears at Bhavaaniipur. At Baalchchaapar it again disappears, but appears again at Bara Khera; at Urnai near Pehoa, ..." (B. C. Law, *Mountains and Rivers of India*, 1968, p. 195)

Bahawalpur’s alluvial grounds are cluttered with a number of depressions and palaeochannels of dried-up river beds of the Hakra system. These channels had apparently linked up the Ghaggar-Hakra-Nara-Wahinda rivers which flow parallel to and south of the Sutlej-Indus rivers, skirting the Great Indian desert. A channel from the snow-fed Sutlej river at the Sulemanki Weir meets the Hakra (Ghaggar) just above Fort Abbas. This explains the increased width of the dried-up river bed west of Fort Abbas and for the occurrence of the Ganweriwala and other 413 sites in a crescent all along the river banks of the erstwhile Sarasvati river. Rupar is on the left bank of the Sutlej in the foothills of the Siwalik mountains. A number of

pre-Harappan and Harappan sites are located nearby in chols and nais such as: Sirhind nadi, Markanda and Patialvi which are part off the Hakra (Ghaggar) river system, which is principally fed by monsoons in the Siwaliks and lower Himalayas.

Nara ran parallel to the Sindhu and joined the Rann of Kutch, before the earthquake of 1833. "The Gulf of Kutch was an inlet of the Arabian sea and has now been silted up by the detritus poured into it by rivers flowing from east to northeast. This is why in winter (November to March) during the regime of the north-eastern monsoon, the Rann presents a salt-encrusted desolate mud-flat, enlivened only occasionally by a passing camel caravan or wild asses, but during the other half of the year, is flooded with water that is held back mainly by the ebbing sea, due to monsoon gales… Fairservis went to the extent of… taking Desalpur as a seaport contemporary with Lothal A and indicative of the sustenance of the sea-connections between Sind and Gujarat." (Soundararajan, 1984).

R.D. Oldham, 1886, On probable changes in the geography of the Punjab and its rivers - a historico-geographical study, J. Asiatic Soc. Bengal, 55: 322-343:

`` ... we have now seen that a dry river bed can be traced, practically continuously, from Tohana in Hissar district to the Eastern Narra in Sind ... `` C.F. Oldham, 1893, The Sarasvati and the lost river of the Indian Desert, Journal of the Royal Asiatic Society, pp. 48-76: `` ... local legends assert (that Sarasvati) once flowed through the desert to the sea. In confirmation of these traditions, the channel referred to, which is called Hakra or Sotra, can be traced through the Bikanir and Bhawulpur states into Sind, and thence onwards to the Rann of Kutch... attested by the ruins everywhere overspread what is now an arid sandy waste. Throughout this tract are scattered mounds, marking the sites of cities and towns. And there are strongholds still remaining ...

"Amongst these ruins are found, not only the huge bricks used by the Hindus in the remote past, but others of a much later make ... Freshwater shells, exactly similar to those now seen in the PanjAb rivers, are to be found in this old river-bed and upon

its banks ... After entering Sind the Hakra turns southward, and becomes continuous with the old river-bed generally known as Narra. This channel, which bears also the names of Hakra or Sagara, Wahind and Dahan, is to be traced onward to the Rann of Kutch... Tha Hakra varies in different parts of its course from about two to six miles in width, which is sufficient for a very large river ... The only river near Marot was the Hakra ...

The dried-up bed -- wadi -- of sarasvati might have constituted the great road between hastinApur and dvArAvatI (dwAraka). Part of this road would have constituted the road from Sind to Delhi via Bahawalpur, MaroT, Anupgarh, Suratgarh, Dabli, Kaalibaggaan., Bht.ner (Hanumgarh), Tibi and Sirsa suggested by Major F. Mackeson in 1844 to the British government (Report on the Route from Seersa to Bahawulpore, *JAS, Beng.,* XLII, Pt.I, 1844, No. 145 to 153)]. A synonym of sirsa is sarsuti < sarasvati; at this place, about 100 miles below Rassauli, a fortress was built.

In 1907, Sven Hedin found the source of the Sindhu River at the spring of Singikabab near the Manasarovar in Tibet. This is at a height of 16,946 feet. (Pithawala, M.B.,1959, *A Physical and Economic Geography of Sind (The Lower Indus Basin)*.:Karachi:P Sindhi Adabi Board:67). The River Brahmaputra (also called Lohitya) emanates from this expansive glacier and flows eastward. S'utudri (or S'atadru or Sutlej) also originates from the Manasarovar and had, in ancient times, joined the Sarasvati River System at Shatrana in Punjab, where the palaeo-channel of the combined river is as wide as 20 kms. as seen from the satellite images. (cf. Yashpal et al, 1980). The Sindhu starts flowing west, then northwest where the river Ka-erh Chu (Zaskar) joins Sindhu and the combined river flows through Ladakh for 600 kms and through Skardu into Gilgit before turning south as the river enters the plains from the Himalayan peaks. Flowing through the NW Frontier Province of Pakistan, the Sindhu is joined by Kabul river at Attock. Below the Salt Range, the Sindhu ceases to be meandering and becomes navigable as it emerges as the Panjnad, after the confluence of Jhelum, Chenab, Ravi, Beas and Sutlej.

“The active flood plain might be described as the summer bed of the river as almost all this land is inundated during that season. The position of channels and river bars are continually changing within this land form. Erosion and deposition take place on a vast scale during the flood season and the surface form becomes stable only after the water-flood has receded. During the low water season the active flood plains have a level or very slightly undulating surface, scarred by numerous active or abandoned channels…Although the active flood plains are flooded annually, they do not merit the term ‘waterlogged’. The soil is sufficiently permeable to allow excess water to drain off soon after the flood-water recedes…Dry cropping during the rabi (winter) cultivation season is possible.” (Fraser, I.S., 1958, *Report on a reconnaissance survey of the landforms, soils and present landuse of the Indus Plains, West Pakistan,* Washington D.C.: Colombo Plan Cooperative Project: 29). This contrasts with the situation of ‘waterlogging’ in Punjab and Haryana in the Sarasvati River Basin; since the soil in these regions is not permeable, the waters brought in by the monsoon-fed channels from the foothills of the Siwaliks tend to create waterlogging conditions since the natural drainage system provided by the erstwhile courses of the Sarasvati River System stand desiccated today.

D. A. Holmes, 1968, The recent history of the Indus, *Geographical Journal*, 134: 367-382: ``.. Lambrick (H.T., 1967, The Indus Flood-plain and the `Indus' civilization, *Geographical Journal*, 133,4: 483-95) believes that the union of the Sutlej with the Beas (and thence with the Indus) in the West Punjab had already occurred prior to the time of Alexander. It must be assumed that the Nara was continuing to flow as a result of seasonal overspill from both the Indus and the Sutlej, the latter floods using the now dry Ghaggar channel (which is a remnant of the Sutlej-Nara system) ... "

"... The western arm of the Hakra is formed by a combination of three rivers each of which is known as Naiwal. They are designated eastern, middle and western Naiwal. According to Oldham (1893: 58) these streams meet near Kurrulwala (29.33N 73.52E) south of the town of Abohar in Punjab… In the map published by

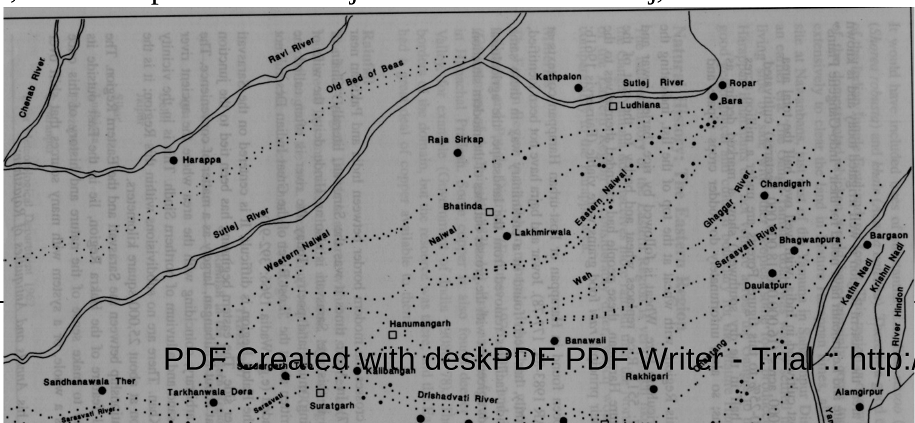
Pande (Pande, B.M., 1977, fig. 2.21) the eastern and middle Naiwals are shown joining the Ghaggar south of Hanumangarh, as well as the western Naiwal a little further west. Between the western Naiwal and the Sutlej, Oldham has shown two more dry beds both of which join the Sutlej. The eastern of these beds is known as the Dhunda. Oldham was of the opinion that the Sutlej flowed into the Hakra or Sarasvati through each of these dry beds, gradually shifting its course from east to west. When the Sutlej shifted its course westward 'and abandoned the eastern arm of the Hakra, the Sarasvati, which had been a tributary, was left in possession of the deserted channel, in the sands of which its waters were swallowed up (Oldham 1893: 59)" (Misra, V.N., 1984).

The use of the river tracts in Gujranwala District of western Punjab is described in the Govt. of India Gazetteer of 1884:

"Thus the district may be divided into two distint portions—one the cultivated portion or *des*, and the other the grazing tract of *bar*. The former comprises…the land…on the bankis of the rivers to the south. The latter contains that large, uncultivated tract which runs right athwart the Doab and down its center. In their general aspect, productions, and capabilities these tracts differ greatly, as well as in the character and habits of the inhabitants. In the *des* we find agriculturists of settled habits, with rights and property in the soil, and deriving their chief support from their cultivation; whilst the people of the *bar* are graziers, leading a nomad life; possessing little or no landed property, and subsisting more on the profits derived from their cattle than their land. In the former we find the soil good, water near the surface, wells numerous, cultivation superior, agriculture thriving, proprietors fairly industrious, village lage…The *bar* may be described as a flat, level tract covered with rich grass and thickly dotted over with bush jungle…The general resources of this district may be thus classified—agricultural produce from the *des*; and the spontaneous products, as wood, grass, etc., together with the profits derivable from grazing, and milch kine, from the bar." (Govt. of India, 1884, :*Gazetteer of the Gujranwala* District, *1883-84*, Lahore, Punjab Government: 3-4).

Sarasvati River and tributaries east of Anupgarh (After Pande, B.M., 1977, Archaeological remains along the ancient Sarasvati. In, D.P. Agrawal and B.m. Pande, eds., *Ecology and Archaeology of Western India*. Delhi: Concept Publishing: 55-60; and Possehl, G.L., 1999, Fig. 3.137). The three Naiwal courses of the Sutlej seem to be part of the complex of fluvial features noted in satellite images as the signature tunes of the northwestern migration of the Sutlej river (note the 90-degree westward turn near Ropar, suggesting tectonics as the cause of the migration of the Sutlej river), away from the Sarasvati River system before being captured by the Beas River to join with the Sindhu River system. (Agrawal, D.P. and Sood, R.K., 1982, Ecological factors and the Harappan Civilization. In, Possehl, Gregory L., ed., *Harappan Civilization: a contemporary perspective*. Delhi: Oxford and IBH and the American Institute of Indian Studies: 223-31).

Raverty, H.G.Major, Bombay Army, 1893, The Mihran of Sind and its tributaries: a geographical and historical study, *Journal of Asiatic Society of Bengal*, Vol. lxi, Pt. 2, pp. 155-297: `` ... to notice some of the numerous fluctuations in the courses of the Sindhu, Ab-i-Sind, or Indus, and of the rivers of the Panj-ab. The changes in the courses of two of these rivers, together with the drying up of the Hakra, Wahindah, or Bahindah were so considerable that they reduced a vast extent of once fruitful country to a howling wilderness, and thus several flourishing cities and towns became ruined or deserted by their inhabitants ... the old course of the Biah, or `Bias' previous to its junction with the Sutlaj, when both rivers lost their names and



became Hariari , Nili or Gharah ... why the army of Islam marched along the bases of the mountains, for the route was long, and the way by Sasruti and Marut was nearer? He (Mangu Khan) was answered that the numerous fissures on the banks of the river rendered the way impossible for the army ... Sarasti is the ancient name of Sirsa: Sursuti is the name of a river, the ancient Sarasvati ...

"Sutlaj was a tributary of the Hakra or Wahindah ... Hakra ... appears to be the modified form of Sagara, the letter S being pronounced H in Rajputana and Sindh ... Sagar is the Sanskrit for `ocean', `sea' etc., and it is still known as the Sind-Sagar near the sea coast. Tod calls it the `Sankra', which is another form of the name; and it is called Sankrah in the treaty entered into by Nadir Shah, and Muhammad Shah, Badshah of Dihli, when ceding all the territory west of it to the Persians ... Hakra did once run through the so-called `Indian Desert' ... Ghag-gar, the Sursuti and the Chitang were also the tributaries of Sind-Sagar or Wahindah or Hakra ... Mansuriyat ... this city is situated among the branches of the Mihran river, and from that place the river unites with the ocean by two channels. One is near the town of Loharanj, and the other bends round towards the east in the confines of Kaj (Kachch) and is called the Sind Shakar (Sind-Sagarah) which means the The Sea of Sind. The river Sarasat unites with the ocean to the east of Suminath.

This last named river is, of course, the Sarasvati, which falls into the sea near Pattan Som-nath, not the classical river, the tributary of the Ghag-gar, described further on, the sacred river of the Brahmans... At Thatha the Sind is called Mihran..."

Aurel Stein, 1942, A survey of ancient sites along the `lost' Sarasvati River, *Geographical Journal*, 99: 173-182: `` ... the sketch-map based on the latest survey shows how great is the contrast between the very scanty volume of water brought down by the Ghaggar and the width of its dry bed within Bikaner territory; over more than 100 miles it is nowhere less than 2 miles and in places 4 miles or more. This bed is lined on both sides by dunes varying in height ... the Ghaggar bed above Hanumagarh, one notes that the number of mounds marking ancient sites

long abandoned is here distinctly smaller than farther down the old river bed ... (mounds) known as ther or theri ... Archaeological facts prove cultivation, and with it settled occupation, to have been abandoned much earlier on the Hakra than on the Ghaggar ... trial excavation at Sandhanawala Ther, 3 miles to the north-west of Fort Abbas ... some sherds with incised characters which appear on many inscribed seals from Mohenjodaro and Harappa, chief sites of the Indus Valley cultre ... The great height and size of several others indicate prolonged settlement ... the evidence shows that down to historical times the Ghaggar carried water for irrigation under existing climatic conditions much farther than it does now. This makes it intelligible how the Sarasvati has come in hymns of the R.gveda to be praised as a great river ... upper portion of the ancient bed ... drying up during historical times ... hastened by diversion of flood water for irrigation brought about by more settled conditions and the resulting pressure of population. Lower down on the Hakra the main change was due to the Sutlej having in late prehistoric times abandoned the bed which before had joined the Ghaggar: the result of a law affecting all rivers whose course lies over alluvial plains ...

Raverty, H.G.Major, Bombay Army, 1893, The Mihran of Sind and its tributaries: a geographical and historical study, *Journal of Asiatic Society of Bengal*, Vol. lxi, Pt. 2, pp. 155-297: `` ... to notice some of the numerous fluctuations in the courses of the Sindhu, Ab-i-Sind, or Indus, and of the rivers of the Panj-ab. The changes in the courses of two of these rivers, together with the drying up of the Hakra, Wahindah, or Bahindah were so considerable that they reduced a vast extent of once fruitful country to a howling wilderness, and thus several flourishing cities and towns became ruined or deserted by their inhabitants ... the old course of the Biah, or `Bias' previous to its junction with the Sutlaj, when both rivers lost their names and became Hariari , Nili or Gharah ... why the army of Islam marched along the bases of the mountains, for the route was long, and the way by Sasruti and Marut was nearer? He (Mangu Khan) was answered that the numerous fissures on the banks of the river rendered the way impossible for the army ... Sarasti is the ancient name of Sirsa: Sursuti is the name of a river, the ancient Sarasvati ... Sutlaj was a tributary of the Hakra or Wahindah ... Hakra ... appears to be the modified

form of Sagara, the letter S being pronounced H in Rajputana and Sindh ... Sagar is the Sanskrit for `ocean', `sea' etc., and it is still known as the Sind-Sagar near the sea coast. Tod calls it the `Sankra', which is another form of the name; and it is called Sankrah in the treaty entered into by Nadir Shah, and Muhammad Shah, Badshah of Dihli, when ceding all the territory west of it to the Persians ... Hakra did once run through the so-called `Indian Desert' ... Ghag-gar, the Sursuti and the Chitang were also the tributaries of Sind-Sagar or Wahindah or Hakra ... Mansuriyat ... this city is situated among the branches of the Mihran river, and from that place the river unites with the ocean by two channels. One is near the town of Loharanj, and the other bends round towards the east in the confines of Kaj (Kachch) and is called the Sind Shakar (Sind-Sagarah) which means the The Sea of Sind. The river Sarasat unites with the ocean to the east of Suminath. This last named river is, of course, the Sarasvati, which falls into he sea near Pattan Som-nath, not the classical river, the tributary of the Ghag-ghar, described farther on, the sacred river of the Brahmans ... At Thatha the Sind is called Mihran ..."

The tail-end of the Hakra is used presently as the perennial canal of the Sukkur barrage project. The heights above sea-level along the Sarasvati-Hakra course are as follows: Bahawalpur 559 feet, Rawanwala 449 feet, Kudwala 385 feet, Badalwala 375 feet, Bhagla 347 feet, Sukkar (SW of Amarkot) 190 feet, Mohenjo daro (180 feet). The Sarasvatì flowed down along 69E and into the Rann of Kutch at 24.2N 69.1E .

Sarasvati Civilization: riverine history of 8,000 years

The civilization lasted continuously for over 7 millennia from about 9,000 years Before Present (i.e., from 7000 BC Mehergarh to 1000 BC, late Harappan) and the substratum of the people of the civilization continued into the historical periods in Bharat.

More significantly, it is now a consensus among scholars that the culture continued into the historical periods, even after the desiccation of the Sarasvati River since

many people migrated eastwards, westwards and southwards to resettle in other river valleys. This explains the distribution of smaller size settlements, for example, in the Ganga-Yamuna doab and in the regions on the right bank of Sindhu in Baluchistan and Afghanistan. The memory of the Sarasvati River was carried by these migrants; for example, there is a river called Haraquaiti in Afghanistan, and there are the rivers called Sarasvati in Pushkar, Rajasthan and Sarasvati which joins the Little Rann of Kutch in Gujarat. The local tradition in almost all parts of Bha_rat is that when two rivers join, the san:gamma is called triven.i san:gamam; how can this be? Where is the third river? The answer is simple; the third river is the Sarasvati river which flows underground! That Sarasvati River did flow underground is now established as a groundtruth by earth scientists. In Jaisalmer, the scientists of Bhabha Atomic Research Centre found that the deep water wells (30 m. deep) in Jaisalmer area contained water from the Himalayas flowing through underground channels, called aquifers, and dated to over 8000 years Before Present.

Section 3: River Sarasvati: culture, arts and crafts

Homage to Pitr.s (ancestors) of Bha_ratam Janam

A homage to Sarasvati, the Goddess of Knowledge, arts and crafts is a tribute to the pitr.s of all bha_ratiyas (referred to as Bha_ratam Janam in the R.gveda), the pitr.s who were r.s.i-s, kavi-s, artisans and craftspersons who have made this pun.yabhu_mi Bha_rat, by harnessing the technologies of the bronze age and by laying the unshakeable foundations of a spiritually vibrant nation governed by what may be paraphrased as **sana_tana dharma**. The nation remembers these fathers of the nation, with gratitude and admiration, while cherishing the glorious heritage they have bequeathed to the entire world civilization exhorting **a_no bhadra_h kratavo yantu vis'vatah**, let noble thoughts come to us from all sides.

River Sarasvati nurtured on her banks a people of the warrior-class, a people who had producedd exquisite works of art – of metal crafts of metallic arms and armour and other arts using a variety of material of mother earth. No wonder, we as proud inheritors of this heritage, adore Sarasvati as mother goddess of knowledge, arts and crafts and adore Durga, as mother goddess of valour. The continuing tradition of sculpture and painting, adores people of valour by depicting many gods and goddesses carrying multiple weapons on their multiple arms. The Dussehra or Navara_tri including the a_yudha pu_ja, Sarasvati and Durga pu_ja is a celebration, recollecting the memories of our ancestors, of the legacy of valour and noble Vedic thoughts, left for the entire world civilization to cherish.

Akhan.d.a Bha_rat 5,500 BP

These ground-truths of River Sarasvati's cultural history have been unraveled through thousands of artifacts found in several hundreds of archaeological sites on the River Basin, thanks to the spade of the archaeologists and celebrated in the R.gvedic r.cas and other ancient texts of Bharat. These will be the tools which will

also help us unravel the key to an understanding of the writing system of the Indian civilization of akhan.d.a bha_rat, which emerged ca. 5,500 Before Present (BP). Indian civilization has been controlled by the same factors which controlled any other civilization in the world. It will be erroneous to depict Indian civilization as concerned with only soul and salvation with little concern for worldly phenomena.

R.gveda no doubt abounds in mythology and an excessive reliance on this text to reconstruct the ancient roots of Indian civilization is likely to present a distorted historical picture.

Indians were great seafarers of antiquity. India had a well-organized system of trade guilds.

Epigraphical inscriptions show an abiding interest in worldly affairs, and provide evidence of warfare and struggles among clans and kingdoms and also efficiencies in governance and social organization.

Let us proceed from the known to the unknown. Assyriology has provided clues as to the purposes served by cylinder seals and clay tablets used in Mesopotamia, ca. 3rd millennium B.C.

Many gods and goddesses in Mesopotamian iconography (cylinder seals, in particular) are seen carrying weapons.The present decipherment indicates that many inscriptions relate to weapons. The depiction of deities in Indian iconography carrying weapons, in the historical periods, is perhaps a legacy of the adoration of valour during the periods following the bronze age.

The script, which was written from right to left, is known from the 2,000-odd short inscriptions so far recovered, ranging from single characters to inscriptions of around 20 characters. There are more than 500 signs, many appearing to be compounds of two or more other signs, but it is not yet clear whether these signs are ideographic, logographic, or other. Numerous studies of the inscriptions have

been made during the past decades, including those by a Russian team under Yuri Knorozov and a Scandinavian group led by Asko Parpola. Despite various claims to have read the script, there is still no general agreement...

The Harappans also employed regular systems of weights and measures. An early analysis of a fair number of the well-formed chert cuboid weights suggested that they followed a binary system for the lower denominations--1, 2, 4, 8, 16, 32, 64--and a decimal system for the larger weights--160, 200, 320, 640, 1,600, 3,200, 6,400, 8,000 and 12,800--with the unit of weight being calculated as 0.8565 grams. However, a more recent analysis, which included additional weights from Lothal, suggests a rather different system, with weights belonging to two series. In both series the underlying principle was decimal, with each decimal number multiplied and divided by two, giving for the main series ratios of 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100, 200, 500(?). [1994-1998 *Encyclopaedia Britannica*]

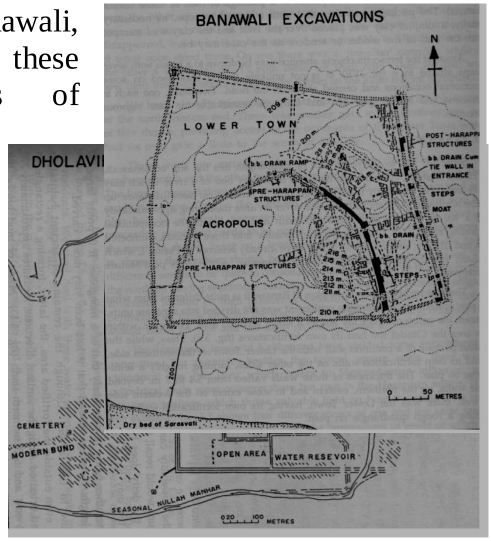
For the trade with Mesopotamia there is both literary and archaeological evidence. The Harappan seals were evidently used to seal bundles of merchandise, as clay seal impressions with cord or sack marks on the reverse side testify. The presence of a number of Indus seals at Ur and other Mesopotamian cities and the discovery of a "Persian Gulf" type of seal at Lothal--otherwise known from the Persian Gulf ports of Bahrain (ancient Dilmun, or Telmun) and Faylahkah, as well as from Mesopotamia-- provide convincing corroboration of the sea trade suggested by the Lothal dock. Timber and precious woods, ivory, lapis lazuli, gold, and luxury goods such as carnelian beads, pearls, and shell and bone inlays, including the distinctly Indian kidney shape, were among the goods sent to Mesopotamia in exchange for silver, tin, woolen textiles, and grains and other foods. Copper ingots appear to have been imported to Lothal from Magan (possibly Oman, the Mahran region, or southeastern Iran). Other possible trade items include products originating exclusively in each respective region, such as bitumen, occurring naturally in Mesopotamia; and cotton textiles and chickens, major products of the Indus region not native to Mesopotamia.

The trade with Oman was in copper, shell and perhaps mother-of-pearl. In Ras' al-Junayz in Oman, a large black-shipped storage jar (with graffiti) was found together with a bronze Indus stamp seal Two copper seals with less refined depictions of unicorn-like animals were found at Lothal and at the site of Ras al-Junayz in Oman. (S.R. Rao, 1985, *Lothal: a Harappan prot town (1955-1962);* vol. 2 Memoirs of the ASI, no. 78 (New Delhi, ASI, 1985), CLIV.c.314; Serge Cleuziou,Cherado Gnoli, Robin Christian and Maurizio Tosi, 1994, Cachets inscrits de la fin du IIIe millenaire avant notre ete a Ras' al-Junayz, Sultanat d'Oman, *Academie des Inscriptions and Belles-Lettres, Comptes rendus des scances de l'annee 1994* (April-June 1994), 453-68; Cleuziou, Serge and Maurizio Tosi, 1989, The southeastern frontier of the ancient Near East, *South Asian Archaeology, 1985*, Karen Frifelt and Per Sorensen, eds., London, Curzon Press, 15-48).

Mesopotamian trade documents, lists of goods, and official inscriptions mentioning Meluhha (the ancient Akkadian name for the Indus region)supplement Harappan seals and archaeological finds. Literary references to Meluhhan trade date from the Akkadian, Ur III, and Isin- Larsa Periods (i.e., c. 2350-1800 BC), but as texts and archaeological data indicate, the trade probably started in the Early Dynastic Period (c. 2600 BC). During the Akkadian Period, Meluhhan vessels sailed directly to Mesopotamian ports, but by the Isin-Larsa Period, Dilmun (modern Bahrain) was the entrepôt for Meluhhan and Mesopotamian traders. By the subsequent Old Babylonian period, trade between the two cultures evidently had ceased entirely. (see also Index: 3rd Dynasty of Ur).

The decipherment of inscriptions of the Sarasvati Sindhu civilization as lists of weapons fits with the emergence of the bronze age in India ca. 3000 BC and the nature of trade contacts with neighbours, in particular, the people of the Mesopotamian civilization.

Locus and patterns of layouts of settlements

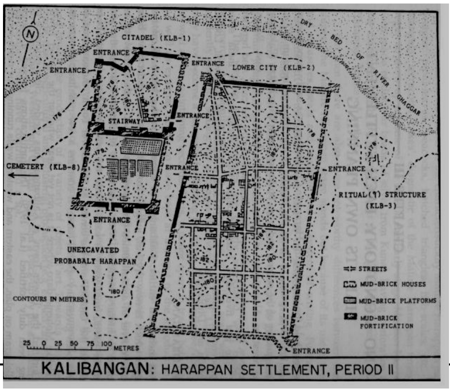


Kunal, Dholavira (Kotda), Banawali, Kalibangan, Surkotada, and Lothal: All these six settlements are on the banks of rivers/tributaries along the course of the Sarasvati river.

Each settlement is uniquely laid out on the banks of a river/tributary, which is apparently the principal source of drinking water supply for the settlements.

In these Early Harappan sites, there is evidence of town-planning (i.e. laying-out of streets and houses along cardinal directions), fortification of settlements and the concept of dividing the settlement into two parts: the citadel and the Lower Town. These characteristics anticipate the Mature Harappan characteristics. In Banawali, there is evidence of the use of fired-bricks even during the Early Harappan phase. It should, however, be noted that many houses at Banawali, Kalibangan and Lothal were made of sun-dried bricks.

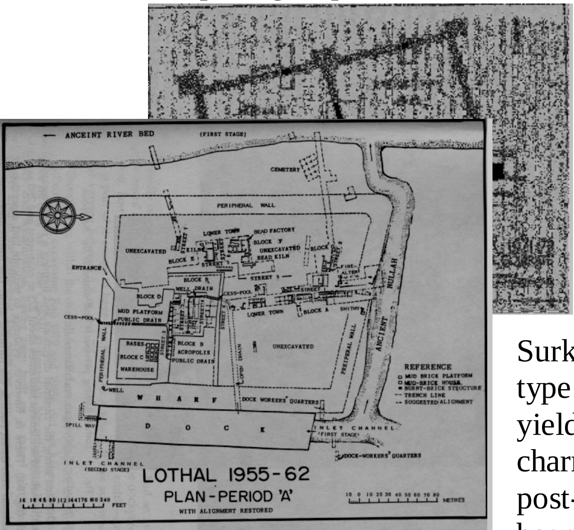
Dholavira (Kotada) (After Bisht 1989)



Kalibangan (After Lal, 1998)

Surkotada (after Joshi 1990)

Surkotada. 160 km. northeast of Bhuj in Rann of Kacch. A common 7m. thick wall with an opening, separated the citadel and the Lower Town. The citadel was built



over a platform. The entrance to the citadel was provided with a ramp, barbican, steps and guard rooms. "...was there any special reason for this small yet fortified establishment? Had we enough evidence about the war-equipment of the Harappans, we would have taken Surkotada as a garrison town." (Lal, op cit., p. 37). Four graves were excavated in Surkotada. None of them was the extended burial type evidenced in Lothal. In one grave, 'the pit yielded a red ware sherd of an urn and very small charred human bone splinters or remains... The post-cremation human remains found in a burial bear a great significance. The relatives of the dead in all probability out of regard for the deceased used to take care of the burnt or charred bones after submission of the corpse to fire'. (Joshi, 1990: 369).

Lothal (After Rao 1979)

Lothal. On the banks of a tributary of the river Bhoga_vo which joined Sa_barmati_ which fell into the Gulf of Khambat (an inlet of the Arabian sea). Fortified settlement. Mud-wall of an average thickness of 12-13 m. On the eastern side, against which the dockyard was located, the wall measured 20-21 m. in width. Part of the wall had served as a wharf. Estuarine shells were found in the complex substantiating the structure as a dockyard. To the west of the wharf was a mud-brick platform (48m X 40 m) called a 'warehouse'. A series of square mud-brick blocks were found on the platform with an intermediary passage of 1.2 m. width. In the passage were found: charred log, plenty of ash and charcoal and 65 burnt sealings of clay, with impressions of the wrapping fiber and knotted thread on one

side and of seals on the other. This is evidence that the platforms had held stamped packages.

The citadel or acropolis was built on a raised platform, 3.5m. high. Twelve bath-pavements with accompanying drains. To the south of these structures was a 'warehouse'. Apart from a house which yielded copper ingots, crucibles etc., a bead-making kiln was identified.

Economic activity: Mesopotamian trade with Aratta, Dilmun, Magan and Meluhha

The list of products exchanged with the civilization areas of Mesopotamia, starting from ca. third millennium BC, provide a framework for analyzing the economic activities in and the state of arts and crafts and bronze-age technologies, of the Sarasvati Sindhu River Valley civilization area.

Aratta, Dilmun, Magan and Meluhha are areas south or east of Mesopotamia.

Aratta

Enmerkar, the king of (Early Dynastic Period II) wanted from the state of Aratta: gold, silver and semi-precious stones, particularly lapis lazuli, to beautify shrines and temples, especialy the Apsu temple in Eridu. He implored Inanna: " O my sister, Inanna, for Erech Let them (the people of Aratta) fashion artfully gold (and) silver, Let them... pure lapis lazuli from the slab,.... Of the holy giparru where you have established (your) dwelling... Let the people of Aratta, Having brought down the stones of the mountains from their highland, Build for me the great chapel, set up for me the great shrine." (S.N.Kramer, Enmerkar and the Lord of Aratta, p. 9, line 38 ff.). To reach Aratta, Enmerkar's herald had to traverse Anshan, a kingdom bordering Elam... and then cross seven further 'mighty mountains'. (S.N.Kramer, *Enmerkar and the Lord of Aratta, A Sumerian Epic Tale of Iraq and Iran*, 1952, p.

17, line 166 ff.) Enmerkar was the second king of the first dynasty of Ur, of which Gilgamesh was the fifth.

Products imported into Ur from Dilmun
Late third and early second millennium BC

lapis lazuli
cornelian
semi-precious stones
ivory and ivory objects
copper
silver
'fish-eyes'
red gold
white corals
various woods
dates

[Except for the dates and 'fish-eyes', all the commodities came to Dilmun from elsewhere for onward shipment; cf. Tilmun: Edzard et al., 1977, p. 157-8; Groneberg, 1980: 237).

Products imported into Ur from Magan
Late third millennium BC

timber and wooden objects
a type of onion (?)
copper
ivory
gold dust
cornelian
semi-precious stones

diorite
red ochre
goats

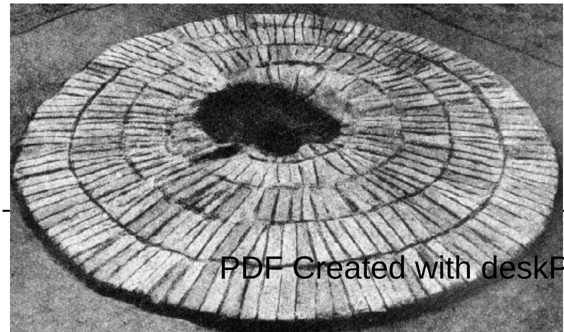
[Cornelian and ivory were being shipped from further east; copper and diorite were local].

Akkadian kings claimed to have campaigned in Magan and taken booty. (Potts, D., 1986).

Products imported into Ur from Meluhha [Texts refer to it as the land of seafarers]
Mid-third to mid-second millennium BC

Timber and wooden furniture
Copper
Gold dust
Lapis lazuli
Cornelian
Birds (including peacock)
Multi-coloured ivory birds
Cornelian monkey
Red dog [The lexeme eruvai and cognate etyma have two meanings: copper and red dog].

(Ratnagar, 1981: 66ff.; P.R.S. Moorey, 1994, *Ancient Mesopotamian Materials and Industries*, Oxford, Clarendon Press.)



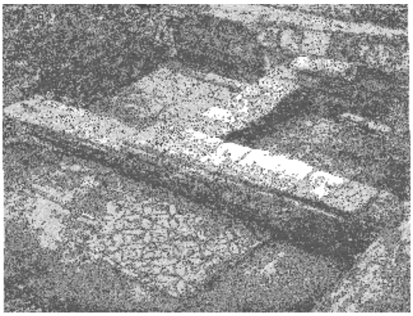
The decipherment of the Sarasvati-Sindhu script will establish what the Harappans, in particular, the braziers, lapidaries, armourers and rathaka_ra of the civilization gave in exchange

for the materials such as tin and lapis azuli/turquoise imported from Sumer and Persia-- weapons or tools of copper and bronze and possibly movable goods such as cotton textiles and various types of beads.

Workers' platforms in Harappa

To the west of Wheeler's circular platform a new platform was discovered. This platform was excavated using modern stratigraphic procedures and detailed documentation. Charcoal, sediment, animal bone, charred plant and other botanical samples were collected from each stratum to complement the other artifacts such as pottery, seals and domestic debris. These samples should allow a more precise reconstruction of the function of these enigmatic structures. Worker's platform (Aftger S.R. Rao, 1973, *Lothal and Indus Civilization*, Bombay, Pl. 1b).

In 1998, the circular platform first exposed by Sir Mortimer Wheeler in 1946 was re-exposed and the area around the platform was expanded to reveal the presence of the room in which it was enclosed. The brick walls had been removed by brick robbers and only the mud brick foundations were preserved along with a few tell-tale baked bricks. This particular platform seems to date to the beginning of the Harappa Phase Period 3C (c. 2200 BC).



The circular platform of a similar type (though smaller in size) was found in a small site in Gujarat, in the house of a copper smith. It is likely that the platform was used by braziers working with molten metal, which explains the association with water...

Kalibangan: a floor of a lower town house with decorated tiles

Harappa: reconstructed platform close-up (white colouring is caused by salt seepage).



All the 18 platforms are equi-distant from one another, the distance varying between 6.09 to 6.4 m from centre to centre. 'Each platform is 11 feet in diameter and consists of a single course of four continuous concentric rings of brick on edge masonry with a hollow at the centre equal to the length of three bricks. The mortar used in them is mud but the pointing is of gypsum.' (Vats 1940,I: 74). Vats was uncertain of their purpose; burnt wheat and husked barley were found in the hollow of Platform 8 and led to the surmise that they were used for pounding grains witha pestle. This surmise may not be correct. There is an assemblage of fourteen small houses between these platforms and Mound AB. The houses are symmetrically grouped along three east-west lanes intersected by six narrower alleys at right angles. The houses were within an enclosure wall, traces of which still survive. Each of these small (56 X 24 ft) detached houses was accessed through an oblique passage to ensure privacy; each house had two rooms with partially brick-paved floors. Near these houses, at a higher level, were found sixteen pear-shaped furnaces. Their major axis varied from 1.01 m to 1.87 m in length. A crucible for melting copper found in one of these furnaces is suggestive of their purpose. We, therefore, infer that the circular platforms were part of the metallurgical- workshop- complex.

It is possible that this socketed platform was used to work on an anvil.

The surmise that the circular platform might have been used by a metalsmith is substantiatedat a small, early Harappan site of Padri. (See: Vasant Shinde, Excavations at the Harappan site of Padri (Bhavnagar District, Gujarat) 1990-91 to 1995-96.

http://www.picatype.com/dig/dl/dl0aa15.htm#back01)

The village, Padri-Gohil-ni (Lat. 22°22'N; Long. 72°95'E) in Bhavnagar District, Gujarat, is located around 55 km to the south of the District headquarters. The ancient site is 2 km to the south of the present village and is spread over an area of 5 ha with a habitational deposit 3.5 m thick.Remains of 3 cultural periods were found, namely:Period I – Early Harappan (c. 3000 – 2600 B.C.), eriod II – Mature Harappan (c. 2500 – 2000 B.C.) and Period III – Early Historic (200 B.C. – 200 A.D.).

Workers' platform in Padri

Padri: Structure Complex: Rooms including a coppersmith's room with a circular platform,circular furnace and copper implements. Early Harappan Phase (c.3,000-2,600 B.C.)

"One of the most significant discoveries is a copper fish-hook, which is 14 cm long and weights 41 gm. A copper fish-hook of such a magnitude has not been reported from any other site so far... The other material equipment include a seal on a stud handle engraved with fish motif, Harappan letters engraved on pot-sherds, cubical chert weights, micro steatite beads, beads of terracotta, carnelian, agate, etc."

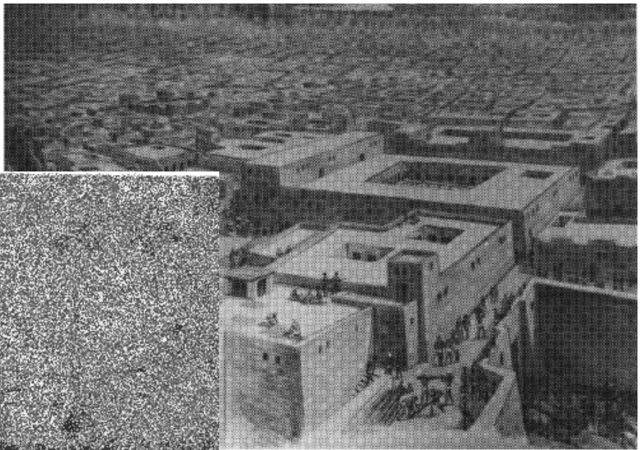
Signs 391-393 and 355 of the script are reminiscent of this circle-shaped platform

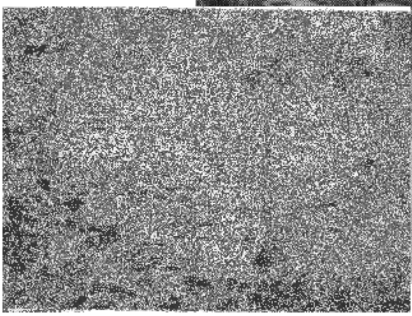


Sal = the Indian gaur, gavoeus gaurus (Santali.lex.)

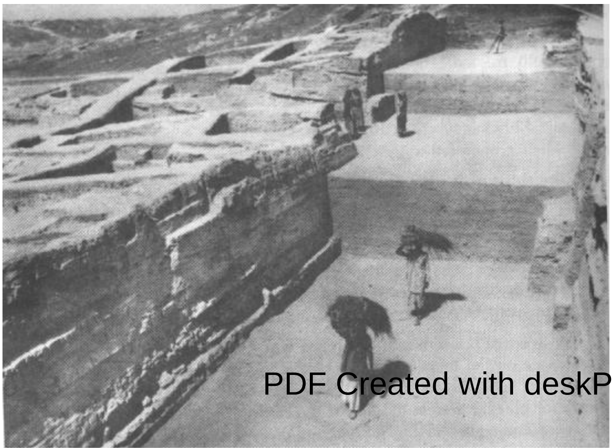
S’a_la is the part of a house where the artisan works. (See Vedic House by Louis Renou).

Workers' quarters, fireplaces, workshops, warehouse





Drawing of Mohenjodaro (Museum of Mohenjodaro); cf. Jansen M., and G. Urban eds. *Reports on Field Work carried out at Mohenjodaro, Interim Reports Vol. 2*, 1987, Fig.7.



Aerial view, DK-1 or Moneer area, Mohenjodaro (ibid., Fig.1, p. 27).

The functions served by the place called the “Great Bath” in Mohenjodaro has not been satisfactorily explained. It would

appear that, in the context of the water-management systems unearthed in Dholavira (Kotada), this structure might simply have been used to store water, perhaps drinking water and water needed for the smiths' work. This surmise is based on the following observations of Lambrick related to the critical problems created by the withdrawal of the waters of the Sindhu. "What is remarkable, in view of what we know of the movements of the Indus during the last twenty centuries, is not that part of the site of Mohenjodaro was flooded out on more than one occasion, and rebult on almost the same plan as before, as is duly mentioned; but that the city could have flourished almost continuously through so long a period as a thousand years. For it is the local withdrawal of the waters of the Indus, and not their temporary excess, that brings calamity in Sind; and with the exception of Sehwan (Aror surves as a village) it is doubtful if any of its living towns have achieved an unbroken period of existence as long as that of Mohenjodaro. All the other places mentioned by the Arab geographers of the tenth century AD are unidentifiable, or lie in ruins; changes in the course of the Indus have been the most important cause of abandonment, as of the foundation of these and most other towns in Sind before and since, up till the nineteenth century." (Lambrick, H.T., 1964, *Sind: a general introduction.* History of Sind Series, Vol. 1. Hyderabad (Pakistan): Sindhi Adabi Board: 72-3).

Banawali. Left bank of the Sarasvati_ river. 20 km. from Kunal. Fired bricks had been used even by the Early Harappans as evidenced at this site. Settlement within a single fortified area. Within this area, the citadel had its own fortification, in a semi-ellipse, with wall-thickness varying from 5.4 to 7 m.Kalibangan: 7.2m wide street



Kalibangan: a Lower Town street Kalibangan. Left bank of the Sarasvati_ river. Citadel on the west; fortified Lower Town in the centre; ritualistic structures on the east. Fortification walls were made mostly of mud bricks, but at a few places kiln-fired bricks were also used. Early brick sizes were

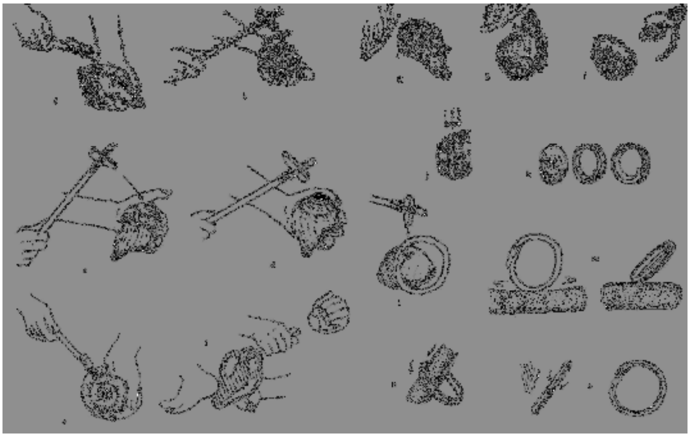
40X20X10 cm. and later ones were 30X15X7.5cm. Street-widths were: 1.8 m., 3.6m, 5.4m and 7.2 m. (note the ratio of 1:2:3:4) On the floors, soiling of terracotta nodules intermixed with pieces of charcoal was overlayed with the clay floor. (The practice is followed even today in many villages.) Between 2600 and 1900 BC, Kalibangan witnessed about nine reconstructions, but not a single structure intruded on the street.

River Sarasvati was alive during the Pre-Harappan and Harappan times; but by the PGW period, the river was dry in stretches, as evidenced by the location of some PGW sites within the entrenched river bed in Bahawalpur province. Y3 channel (Yamuna) seems to have been a flowing river during the PGW times. Chautang river bank has a number of Late Harappan sites.

An increase in rainfall between 8000 BC and 2000 BC (as evidenced by palynological studies of Gurdip Singh (Singh 1971; Singh et al, 1974) in the region of the salt lakes is consistent with the evidence of increased number of settlements of Ahar culture dated between 2100 BC and 1200 BC., in the valleys of Banas and its tributaries in the districts of Udaipur, Chittorgarh, Bhilwara, Ajmer, Tonk. (Misra, V.N., 1968, Early Village Communities of the Banas basin, Rajasthan, in: *Anthropology and Archaeology; essays in the memory of Verrier Elwin*, M.C. Pradhan et al, eds., 295-310, Bombay, Oxford University Press]. “Further north in Bharatpur, Jaipur and Sikar districts, a number of settlements of Ochre Coloured Pottery (OCP) and Ganeshwar cultures have been found in the valleys of the rivers Banganga, Gambhir, Dohan, Krishnavati and Kantli which rise in the northern flanks of the Aravalli ranges and flow north-east into the Yamuna or northward into the sandy plains of Haryana.” (Misra, 1984; Agrawala, R.C., 1981, Recent Explorations in Rajasthan, *Man and Enviro*nment, 4; 89-91). This is a continued exploitation of the copper in the Khetri belt right from the days of the Harappans. One view is that OCP is a late Harappan migrations of poeople.

Arts and crafts: stones, shells and beads

Lapis lazuli was probably from the mines at Badakhshan. Turquoise probably came from Iran; fuchsite from Karnataka; alabaster from Iran; amethyst from Maharashtra; and jade from Central Asia.



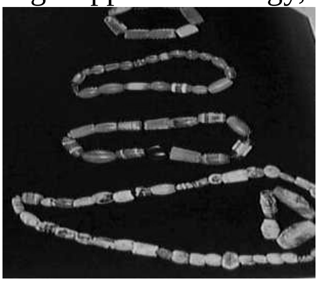
Other special crafts include the manufacture of faience (earthenware decorated with coloured glazes)--for making beads, amulets, sealings, and small vessels--and the working of stone for bead manufacture and for seals. The seals were generally cut from steatite and were carved in intaglio or incised with a copper burin (cutting tool). Beads were made from a variety of substances, but the carnelians are particularly noteworthy. They include several varieties of etched carnelian and long barrel beads made with extraordinary skill and accuracy. Shell and ivory were also worked and were used for beads, inlays, combs, bracelets, and the like.

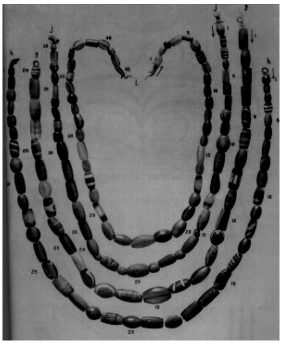
A reconstruction of the process of making bangles from shells (turbinella pyrum); a to f: clipping and removal of internal columella; g to k: sawing shell circles; l to n: finishing the shell blank; o: final incising. “..using a specialized bronze saw...a very thin serrated edge that was long and curved...” (After J.M. Kenoyer, 1998, p.96, Fig. 5.23)

Fragments of cotton textiles recovered at Mohenjodaro provide the earliest evidence of a crop and industry for which India has long been famous. Perhaps, raw cotton was brought in bales to the cities to be spun, woven, and perhaps dyed, as the presence of dyers' vats would seem to indicate.

Bronze Age of proto-historic times is a cultural revolution perhaps second in importance only to the Industrial Revolution of modern times. The Bronze Age, that is, alloying copper and tin, was used only rarely at first. During the 2nd millennium the use of true bronze increased. The age also marked the invention of thewheel and the ox-drawn plough. From about 1000 BC, the ability to forge iron, brought in the Iron Age.

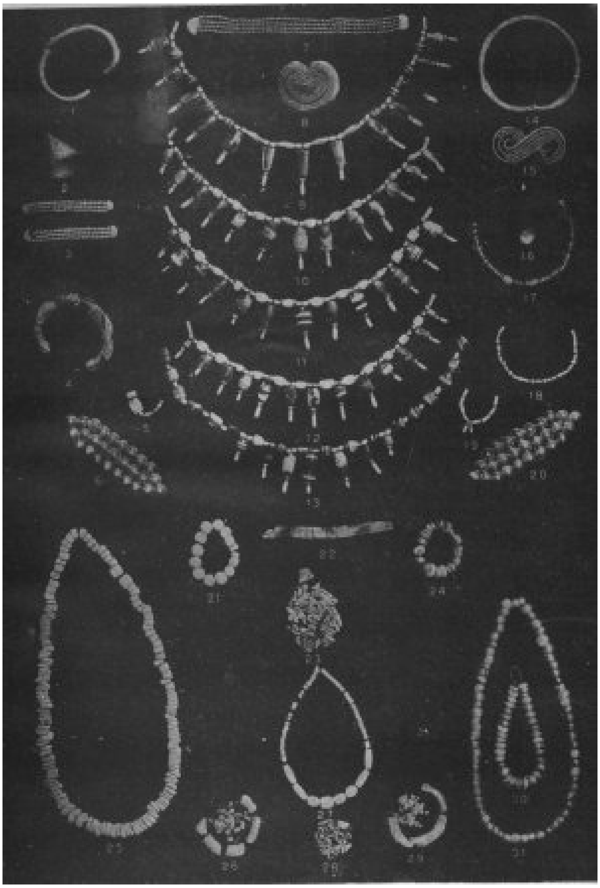
Chalcolithic (Copper-Stone) Age, used pure copper (along with its predecessor tool-making material, stone). Use of copper was known in Mehergarh ca. 7000 B.C. By the mid- 4th millennium, a rapidly developing copper metallurgy, with cast tools and weapons led to urbanization in Mesopotamia and in the Sarasvati Sindhu River Basins.





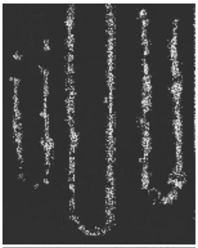
Bead necklaces, Sarasvati Sindhu Civilization

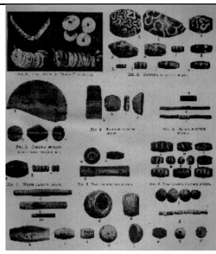
From inside out: No.1: A necklace of very fine beads of jade, jasper, carnelian, chalcedony and agate. The first bead is of gold; No. 2: beads of jasper, carnelian, agate, lapis-lazuli and six of silver; No.3: stones of diverse materials, colours and shapes including two cleverly cut onyx eye-beads; No.4: extraordinary variety in shape, markings and colour. A long flat bead, oval in section was a favourite shape. This necklace also includes several skilfully cut 'cat's eye' onyx beads. (After Marshall, Pl. CL). Silver was used more freely than gold at Mohenjodaro. Maybe, silver was extracted from sulphide or chloride form, mixed with metals such as lead or copper. Gold used in Mohenjodaro, resembles electrum.



...specimens of fillets consisting of thin bands of beaten gold with holes for cords at their endsThe long carnelian beads of the necklace or girdle are 4.85 in. in length by 0.4 in. dia. The shorter beads are 3.25 in. in length. These beads are of a bright translucent red colour. They were bored from both ends, the holes averaging 0.17 in. dia. At each of the necklace or girdle there is a semi-circular terminal of hollow bronze like a flattened cup. The globular beads at each end of the stone ones are of bronze. Nos. 7, 8 and 11 are gold studs, 1.2 in. dia. apparently intended for the ears. Nos. 3-5 and 12-14 are gold needles. A number of bead-caps made of gold, coppery-red to pale yellow in colour are above No.9 which is a turquoise bead capped with gold. (After Marshall, Pl. CLI).

Jewellery, Mohenjodaro. No. 13 shows waste pieces of metal, probably the hoard of a goldsmith. (After Marshall, Pl. CLII).

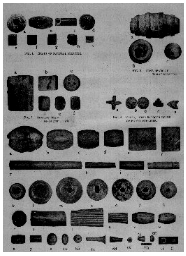




Beads: terracotta, shell, ivory, copper, silver, gold, steatite, Harappa and Ur (After Vats, Pl. CXXXIV).

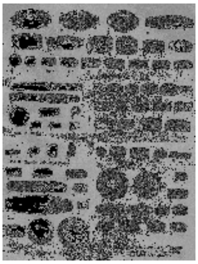
Beads: steatite disc, painted steatite, faience: black, yellow, white, variegated, blue or green (After Vats, Pl. CXXXIII).

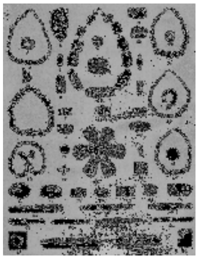




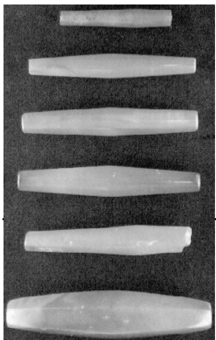
Beads: natural steatite, burnt steatite (After Vats, Pl. CXXXII).

Beads: agate, carnelian, jasper, chert, chalcedony, milky quartz, etched carnelian, limestone, stalagmite, marble, calcite, hornblende, serpentine, deorite, lapis and jadeite (After Vats, Pl. CXXXI).

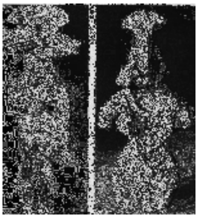


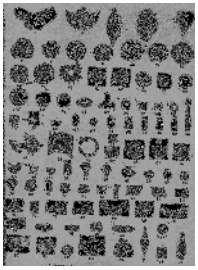


Miscellaneous beads, Harappa (After Vats, Pl. CXXVIII).

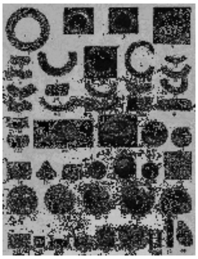


Long barrel-cylinder beads from the Royal Graves of Ur; Akkadian Period (ca. 2250-1894 B.C.); 'a' is of dark green stone; bead 'b' is carnelian and 6.4 cm. long; bead 'c' is carnelian; Chakrabarti, D.K. 1982, Pl. 24.2. (UPenn Museum: 30-12-566 and 567; 32-40-227).





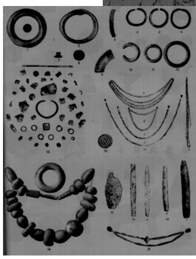
Terracotta figurines, Mohenjodaro, wearing jewellery (cf. Allchin, 1982, Fig. 8.14)



Jewellery from House 2, Trench IV, Mound F, Harappa (After Vats, Pl. CXXXVII).



Personal ornaments, unguent vases and inlay objects, Harappa (After Vats, Pl. CXXXVIII and CXXXIX).



Copper, bronze, silver and gold objects, Harappa (After Vats, Pl. CXXV). Nos. 65-77 spear-heads. Nos. 15-18 and 22-24 chisels. Nos. 28-31, 52 and 62-64 knives and sickles; Nos. 38 and 58 scrapers; Nos. 46 and 47 razors. Nos. 40-42 and 44 bronze gouges (to hollow out, groove or rib wood, bone, ivory and stone) No.39 nail-parer; No.1 a bunch of three bronze instruments held together by their looped or interlaced ends; the right hand tool is a double-edged knife (4.4 in.) and the left hand one a piercing rod (5.3in.); the middle one is a pincers (5.2 in.) all three are a surgical or toilet set. No.32 cobbler's awl(?) Nos. 37 and 45 needles; Nos. 25-27 pins; Nos. 33,34 and 36 antimony rods. No.8 a fish-hook. Nos. 13 and 14 arrow-heads. No.53 silver vase. No.57 a hasp (typical Indian kund.i) made of round copper bar.

Lothal: bead-making kiln

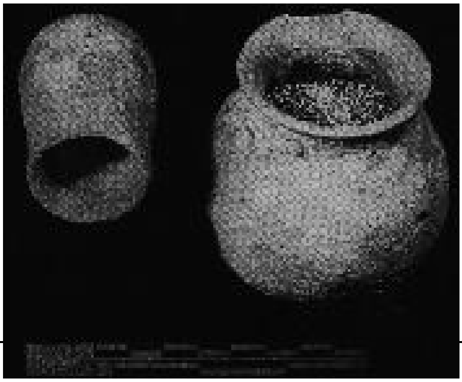


Ur: etched carnelian bead decorated with white designs; found in the royal cemetery; string of decorated carnelian, lapis lazuli and gold beads; Ur: royal cemetery; long carnelian beads; the lowest bead is similar to the ones found in the Harappan region; the lowest bead is faceted with six sides, a type not found in the Harappan region. (JPM # 30-12-573; PG 1422; UPM #B 16792; PG 57; University of Pennsylvania Museum). Most commonly used precious stones were: banded agate, jasper and red-orange carnelian, mostly from Kutch and Gujarat.



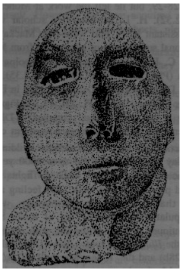
Lapis lazuli was available in Chagai hills of southern Baluchistan and Badakhshan, northern Afghanistan.

Miniature jar fitted with a cork-like, hollow, baked clay stopper; containing microbeads mixed with fine ash; the jar was buried under a house floor at Zekda (23.53N and 71.26E), BanaSkanda District, Gujarat (Hegde, K.T.M. et al, 1982, Pl. 21.2.



Hair-do styles

Figurine of an old man found in L Area, Mohenjodaro (L 898) with a typical way of wearing the hair in a bun-shape which is mirrored in some images from Mesopotamia.

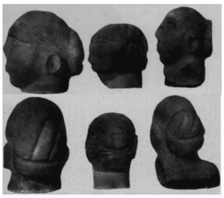




Sumerian electrum helmet from the Royal Cemetery at Ur; early Dynastic III Period, ca. 2400 B.C.; After Prichard 1969b: 49, no.160; Parpola, 1994, p. 254. This helmet was made of beaten gold, in the form of a wig with a most elaborate hair-style. There is a knot of hair tied at the back, a twisted plait and a headband, and there are guards for ears and cheeks. It belonged to Mes-kalam-dug, the 'Hero of the Good Land'; he was perhaps a prince; a cylinder-seal with his name was later found in a queen's grave.



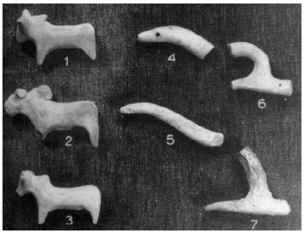




This contrasts with the hair-do of a woman's head found in Mohenjodaro: Limestone figure of the head of a woman (?) with hair-do (from L Area, Mohenjodaro, L 127)



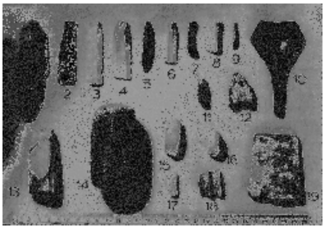
Side view and back view of three steatite male heads showing hair-bun (Nos. 1 and 2 are casts), Mohenjodaro (Marshall 1931: 342, pl. XCV, no. 9; During Caspers 1985, More on the Stone sculpture from Moenjo-daro, *AION 45*, pp. 409-



426). The knobbed hair is paralleled in Early Dynastic II-III cylinder seals from Fara in southern Mesopotamia (Parpola, A. 1984, New correspondences between Harappan and Near Eastern glyptic art: *South Asian Archaeology, 1981*, pp. 176-195).

See a woman's head in diorite found in Nin-Gal temple at Ur, ca. 2150 B.C.; note the engraved modulations of the hair, elaborate bun at the back of the head and the fillet around the forehead.

Plough and bull figure models from Mature Harappan sites in Bahawalpur province (After Mughal, 1997, Pl. 65); the toy ploughs are identical in shape and design to the wooden ploughs used in the region. The ploughs were perhaps fitted with metal ploughshares.



Stone, copper, carnelian and faience objects in 15 sites in Bahawalpur province; Chert blades: 1 to 9; copper spearhead: 10; copper implement: 12; pieces of bangle, biconvex and incised: 15 and 17; piece of wide bracelet incised on external surface and ridged: 18; copper flat axe: 19; Mughal, R.M., 1997, Pl. 63.

Vedic Culture and early Tamil texts

The traditions of Bha_rat related to Ka_rttikeya are a remarkable example of the continuity of the civilization all over South India. Agastya, Skanda and Vedic traditions find expression in early Tamil texts.

Sangam literature is replete with references to the support provided to the growth of Vedic Culture in the Tamil-speaking areas. An important article on the antiquity

of relation between Tamil and Sanskrit is: Sharma, K.V., 1983, "Spread of Vedic culture in ancient south India*" Adyar Library Bulletin* 47:1-1**.**

> “Among the interesting facts that emerge from a study of the progressive spread of vedic culture from the North-West to the other parts of India, is its infusion, with noticeable intensity, in the extreme south of India where, unlike in other parts, a well-developed Dravidian culture was already in vogue… *Tolka_ppiyam* which is the earliest available work of the sangam classics, is a technical text in 1610 aphorisms, divided into three sections, dealing respectively, with phonetics, grammar and poetics… The other available sangam works are three sets of collected poems, being, *pattu-ppa_t.t.u* (Ten idylls), *et.t.u-ttokai* (Eight collections) and *patineki_r..kan.akku* (eighteen secondary texts), which last appears to pertain to the late period of the saµgam age.
>
> “The ten poems are: *tirumuruka_r.r.uppat.ai, porun.ara_r.r.u-ppat.ai, cir.upa_n.a_r.r.uppat.ai, perumpa_n.a_r.r.uppat.ai, mullaippa_t.t.u, maturaikka_n~ci, net.unelva_t.ai, kuriñcippa_t.t.u, pat.t.inappa_lai* and *malaipat.ukat.a_m.* All the above idylls are compositions of individual poets, and, except for the first, which is devotional and possibly, pertains to late sangam age, are centred round the royal courts of the Cera, Cola and Pa_n.d.ya kings, depicting the contemporary elite scholarly society and youthful life.
>
> “The second category consists of Eight collections: *nar.r.in.ai, kur.untokai, ainkur.unu_r.u, patir.r.ujppattu, paripa_t.al, kali-ttokai, akana_n-u_r.u* and *pur.ana_n-u_r.u.* All these collections are highly poetic and self-contained stray verses of different poets put together in consideration of their contents. The third category consists of eighteen miscellaneous texts, some of them being collections of stray verses of different poets and some composed by individual authors. They are: *tirukkur.al., na_lat.iya_r, par..amor..i, tirikat.ukam, na_n-man.ikkat.ikai, cir.upañcamu_lam, ela_ti,*

a_ca_rako_vai, mutumor..i-kka_ñci, kalavar..i-na_r.patu, initu-na_r.patu, tin.aima_lainu_r.r.aimpatu, aintin.ai-y-er..upatu, kainnilai, aintin.ai-yanpatu, tin.aimor..i-y-aimpatu and *ka_r.-na_r.patu*. The verses in these works also refer to social customs and local sovereigns. The above works picture a well-knit and well-developed society having a distinct identity of its own.

"The frequent mention, in sangam poems, of the Cera, Cola and Pa_n.d.ya kings as the munificent patrons of the poets… and the archaeological evidence provided by 76 rock inscriptions in Tamil-Bra_hmi script which corrobate the contents of the sangam works, in 26 sites in Tamilnadu (Mahadevan, I., Tamil Bra_hmi inscriptions of the Sangam age, *Proc. Second International Conference Seminar of Tamil Studies*, I, Madras, 1971, pp. 73-106) help to fix the date of the classical sangam classics in their present form to between 100 B.C. and 250 A.D… reference to the Pa_n.d.yan kingdom by Megasthenes, Greek ambassador to the court of Candragupta Maurya (c. 324-300 B.C.?) are also in point. On these and allied grounds, the sangam period of Tamil literature might be taken to have extended from about the 5th century B.C. to the 3rd century A.D… It is highly interesting that sangam literature is replete with references to the vedas and different facets of vedic literature and culture, pointing to considerable appreciation, and literary, linguistic and cultural fusion of vedic-sanskrit culture of the north with the social and religious pattern of life in south India when the sangam classics were in the making…

"The vedas and their preservers, the bra_hmans, are frequently referred to with reverence (*Pur.ana_n u_r.u* 6, 15 and 166; *Maturaikka_ñci* 468; *tirukat.ukam* 70, *na_n-man.ikkat.ikai* 89, *initu-na_r.patu* 8). The vedic mantra is stated as the exalted expressions of great sages (*Tolka_ppiyam*, Porul. 166, 176). While the great God S'iva is referred as the source of the four vedas (*Pur.a.* 166), it is added that the twice-born (bra_hman) learnt the four vedas and the six veda_ngas in the course of 48 *years (Tiru-*

muruka_r.r.uppat.ai, 179-82). The vedas were not written down but were handed down by word of mouth from teacher to pupil (*Kur-untokai* 156), and so was called kel.vi (lit. what is heard, šruti)(*Patir.r.ippattu* 64.4-5; 70.18-19; 74, 1-2; *Pur.a.* 361. 3-4). The bra_hmans realized God through *the vedas (Paripa_t.al 9. 12-13) and recited loftily in vedic schools (Maturaikka_ñci* 468-76; 656)… the danger to the world if the bra_hman discontinued the study of the veda is stressed in *tirukkur.al.* 560. If the sangam classics are any criteria, the knowledge and practice of vedic sacrifices were very much in vogue in early south India. The sacrifices were performed by bra_hmans strictly according to the injunctions of the vedic mantras (*tirumuruka_r.r.uppat.ai* 94-96; *kalittokai* 36). The three sacred fires (*ga_rhapatya*, *a_havani_ya* and *daks.ina_gni*) were fed at dawn and dusk by bràhmans in order to propitiate the gods (*Kalittokai* 119l *Pur.a.* 2; 99; 122; *Kur.iñcippa_t.t.u* 225). *Paripa_t.al* 2. 60-70 stipulates, in line with vedic sacrificial texts, that each sacrifice had a specific presiding deity, that pas'us (sacrificial animals) were required for the sacrifice and that the sacrificial fire rose to a great height. The vedic practice of placing a tortoise at the bottom of the sacrificial pit is referred to in Akana_n-u_r.u 361… *Patir.r.uppattu* 64 and 70 glorify the Cera king Celvakkat.unkovar..iya_tan- who propitiated the gods through a sacrifice performed by learned vedic scholars and distributed profuse wealth amongst them. Another Cera king, Perum-ceral Irumpor.ai is indicated in Patir.r.uppattu 74 to have performed the Putraka_mes.t.hi_ sacrifice for the birth of his son il.amceral irumpor.ai. The Cola ruler Peru-nar.kil.l.i was renowned as Ra_jasu_yam ve_t.t.a co_r..an- for his having performed the ra_jasa_ya sacrifice; another Cola ruler Nar.kil.l.i, too, was celebrated as a sacrificer (*Pur.a.* 363; 400).

"The Cola kings were also considered to have descended from the north Indian king S'ibi the munificent of *Maha_bha_rata* fame (*Pur.a.* 39; 43). The patronage accorded to vedic studies and sacrifices is illustrated also by the descriptive mention, in *Pur.a.* 166, of a great vedic scholar Vin.n.anta_yan- of the Kaun.d.inya-gotra who lived at Pu_ñja_r.r.u_r in the

Co_r..a realm under royal patronage. It is stated that Vin.n.anta_yan- had mastered the four vedas and six veda_ngas, denounced non-vedic schools, and performed the seven pa_kayajñas, seven ***Soma***-yajñas and seven havir-yajñas as prescribed in vedic texts.

“The Pa_n.d.yan kings equalled the Colas in the promotion of Vedic studies and rituals. One of the greatest of Pa_n.d.ya rulers, Mudukut.umi Peruvar..uti is described to have carefully collected the sacrificial materials prescribed in vedic and dharmašàstra texts and performed several sacrifices and also set up sacrificial posts where the sacrifices were performed (*Pur.a.* 2; 15). *Maturaikka_ñci* (759-63) mentions him with the appellation pal-s’a_lai (pal-ya_ga-s’a_lai of later Ve_l.vikkud.i and other inscriptions), ‘one who set up several sacrificial halls’. The Pa_n.d.ya rulers prided themselves as to have descended from the Pa_n.d.avas, the heroes of Maha_bha_rata (*Pur.a.* 3; 58; *Akana_n-u_r.u* 70; 342)… God Brahmà is mentioned to have arisen, in the beginning of creation, with four faces, from the lotus navel of God Vis.n.u (*Paripa_t.al* 8.3; *Kalittokai* 2; *Perumpa_n.a_r.r.uppat.ai* 402-04; *Tirumuruka_r.r.uppat.ai* 164-65; *Iniyavai-na_rpatu* 1). It is also stated that Brahma_ had the swan as vehicle (*Innà-nàrpatu* 1). Vis.n.u is profusely referred to. He is the lord of the Mullai region (Tol. Akattin.ai 5) and encompasses all the Trinity (*Paripa_t.al* 13.37). He is blue-eyed (Pur.a. 174), lotus-eyed (*Paripa_t.al* 15.49), yellow-clothed (*Paripa_t.al* 13.1-2), holds the conch and the discus in his two hands and bears goddess Laks.mì on his breast (*Mullaippa_t.t.*u 1-3; *Perumpa_n.* 29-30; *Kali*. 104; 105; 145), was born under the asterism Tiru-o_n.am (*Maturai*. 591), and Garud.a-bannered (*Pur.a.* 56.6; *Paripa_t.al* 13.4). Of Vis.n.uite episodes are mentioned his measuring the earth in three steps (*Kali*. 124.1), protecting his devotee Prahla_da by killing his father (*Pari*. 4. 12-21) and destroying the demon Kes’in (*Kali*. 103.53-55).

“S’iva has been one of the most popular vedic-pura_n.ic gods of the South. According to *Akana_n-u_r.u* 360.6, S’iva and Vis.n.u are the greatest gods. He is three-eyed (*Pur.a.* 6.18; *Kali.* 2.4), wears a crescent moon on his forehead (*Pur.a.* 91.5; *Kali.* 103.15), and holds the axe as weapon (*Aka.* 220.5; *Pur.a.* 56.2). He bears river Ganga_ in his locks (*Kali.* 38.1; 150.9) and is blue-necked (*Pur.a.* 91.6; *Kali.* 142). He is born under the asterism *a_tirai* (Skt. *àrdra*) (Kali. 150.20), has the bull for his vehicle (*Paripa_t.al* 8.2) and is seated under the banyan tree (*Aka.* 181). Once, while sitting in Kaila_sa with Uma_ (Pa_rvati), his consort (*Pari.* 5.27-28; *Par..amor..i* 124), Ra_van.a, the ra_ks.asa king shook the Kaila_sa and S’iva pressed the mountain down with his toe, crushing Ra_van.a and making him cry for mercy (*Kali.* 38). When the demon Tripura infested the gods, S’iva shot through the enemy cities with a single arrow and saved the gods (*Kali.* 2; Pur.a. 55; Paripa_t.al 5. 22-28). *Pur.ana_n –u_r.u* (6. 16-17) refers also to S’iva temples in the land and devotees walking round the temple in worship.

“God Skanda finds very prominent mention in saµgam classics, but as coalesced with the local deity Murukan-, with most of the pura_n.ic details of his birth and exploits against demons incorporated into the local tradition (*Paripa_t.al* 5. 26-70; *Tirumuruka_r.r.uppat.ai*, the whole work). Mention is also made of Indra. (Balara_ma) is mentioned as the elder brother of Lord Kr.s.n.a, as fair in colour, wearing blue clothes, having the palmyra tree as his emblem and holding the ;lough as his weapon, all in line with the pura_n.as (*Paripa_t.al* 2. 20-23; *Pur.a.* 56. 3-4; 58.14; *Kali.* 104, 7-8). *Tolka_ppiyam* (Akattin.ai iyal 5) divides the entire Tamil country into five, namely, Mullai (jungle) with Vis.n.u as its presiding deity, Kur.iñji (hilly) with Murukan- as deity, Marutam (plains: cf. marusthali_ Skt.) with Indra as deity, Neytal (seashore) with Varun.a as deity and Pa_lai (wasteland) with Kor.r.avai (Durga_) as deity… The sangam works are replete with references to the four castes into which the society was divided, namely, bra_hman.a, ks.atriya, vais’ya, and su_dra… bra_hman antan.a primarily

concerned with books (*Tol. Mara.* 71), the ks.atriya (***a-ras'a, ra_ja***) with the administration (*Tol. Mara.* 78) and s'u_dra with cultivation (*Tol. Mara.* 81)…

"It is also stated that marriage before the sacred fire was prescribed only for the first three castes; but the author adds that the custom was adopted by the fourth caste also in due course (*Tol. Kar.piyal* 3)… one cannot fail to identify in sangam poetry the solid substratum of the distinct style, vocabulary and versification, on the one hand, and the equally distinct subject-matter, social setting and cultural traits, on the other, both of the Tamil genius and of vedic poetry. As far as the grammar of Dravidian is concerned, a detailed analytical study of Old Tamil as represented in *Tolka_ppiyam*, with the vedic s'iks.a_s and pra_tis'a_khyas, has shown that, 'Tolka_ppiyan-a_r clearly realized that Tamil was not related to Sanskrit either morphologically or genealogically… that he deftly exploited the ideas contained in the earlier grammatical literature, particularly in those works which dealt with vedic etymology, without doing the least violence to the genius of the Tamil language'. (Sastri, P.S.S., *History of Grammatical Theories in Tamil and their relation to the Grammatical literature in Sanskrit*, Madras, 1934, p. 231)…

"It would be clear from the foregoing that during the sangam age there had already been intensive infusion of vedic culture in south India… Both the cultures coexisted, the additions often affecting only the upper layers of society… For novel names, concepts and ideas, the Sanskrit names were used as such, with minor changes to suit the Tamil alphabet (e.g. akin-i for agni, vaicikan- for vais'ya, veta for veda, or translated (e.g. pa_pa_n- for dars'aka, ke_l.vi for s'ruti). When, however, the concept already existted, in some form or other, the same word was used with extended sense (e.g. ve_l.vi for ya_ga; ma_l or ma_yan- for Vis.n.u). Sometimes both the new vedic and extant Tamil words were used (e.g. ti_ for agni)… It is, however, important to note that the coming together of the two cultures, vedic and

> dravidian, was smooth, non-agressive and appreciative, as vouched for by the unobtrusive but pervasive presence of vedicism in the sangam works. The advent of vedic culture into South India was, thus, a case of supplementation and not supplantation… it is a moot question as to when vedic culture first began to have its impact on dravidian culture which already existed in south India… the age of this spread (of vedic culture) has to be much earlier than the times of the Ra_ma_yan.a and Maha_bha_rata, both of which speak of vedic sages and vedic practices prevailing in the sub-continent. Literary and other traditions preserved both in north and south India attest to the part played by sage Agastya and Paras'ura_ma in carrying vedic culture to the south.

"On the basis of analytical studies of these traditions the identification of geographical situations and a survey of the large number of Agastya temples in the Tamil country, G.S. Ghurye points to the firm establishment of the Agastya cult in South India by the early centuries before the Christian era (Ghurye, G.S., *Indian acculturation: Agastya and Skanda,* Bombay, Popular Prakashan, 1977)… the considerable linguistic assimilation, in dravidian, of material of a pre-classical Sanskrit nature, it would be necessary to date the north-south acculturation in India to much earlier times."

Section 4 River Sarasvati: gold-, silver-smithy

Gold in the civilization: use of inscriptions on gold and silver

On the banks of River Sarasvati, (marked as Sarasvati Nadi in Survey of India maps), in a place called Lohar.garh, north of Adh Badri (Dist. Yamunanagar, Haryana), gold panning is licensed to panners even today. The epithets attributed to Sarasvati_ in the R.gveda and Atharvaveda are hiran.yavarn.a_ and hiran.yavartani_.

> ka_ru = bard (cf. ca_ran.a (Skt.)? metalsmith (RV 1.83.6; 7.68.9; 9.112.33)
> karma_ro as'mbhih dyubhih hiran.yavantam icchati: a smith is said to b e making weapons from stone as well as metal (RV 9.112.2)
> A reference to itinerant metal-smiths who make arrows of metal, in the R.gveda (9.112.2) will have to be re-evaluated in the context of this evidence.
>
> jarati_bhih os.adhi_bhih parn.ebhih s'akuna_na_m
> ka_rma_ro as'mabhih dyubhih hiran.yavantam icchati_ (RV. 9.112.2)

This is a description of a smithy, perhaps an allusion to the making of copper reducing the ores. The metalsmiths sold the products (a copper implement or copper-tipped arrow or golden ornament) to moneyed-people.

karma_ra = metalsmith (RV. 10.72.2 **brahman.aspatieta_ sam karma_ra iva_dhamat, deva_na_m pu_rvye yuge asatah sadaja_yata** = metalsmith who blows in a furnace and makes metal objects presumably by casting of molten metal).

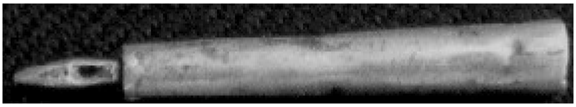
ka_rma_ra = metalsmith who makes arrows etc. of metal (RV. 9.112.2: jarati_bhih os.adhi_bhih parn.ebhih s'akuna_na_m, ka_rma_ro as'mabhih dyubhih hiran.yavantam icchati_)

जरतीभिर् ओषधीभिः पर्णेभिः शकुनानाम् ।

कार्मारो अश्मभिर् द्युभिर् हिरण्यवन्तम् इच्छतीन्द्रायेन्दो परि स्रव ॥

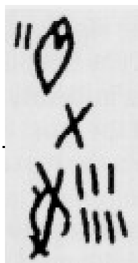
9.112.02 With dried plants (are arrows made), with the feathers of birds (and) with glistening stones; the smith seeks a man who has gold; flow, Indu, for Indra.
(Griffith) The smith with ripe and seasoned plants, with feathers of the birds of air; with stones, and with enkindled flames, seeks him who has a store of gold.
The reference is to the use of charcoal to produce the required temperature to smelt the tridha_tu: three metals used in alloys. The reference is also to the fact that the smith had produced the metal items for sale.

Mohenjodaro: golden pendant with inscription from jewelry hoard (After cat. No.



39 in: J.M. Kenoyer, 1998, Fig. 4.17a) Kenoyer notes that this was a needle-like pendant, though earlier it had been interpreted as a needle; the pendant is made from a hollow cylinder with soldered ends and perforated point. The perforated point could have been used to insert a necklace. (Mohenjodaro E 2044b; gold; 4.16 cm. Long; 0.66 cm. Base dia, 13 cm. Hole dia; Mohenjodaro Museum MM 1374.50.271; Marshall, 1931, 521, pl. CLI B3).

Functions served by inscriptions



Mohenjodaro: sketches of inscription which encircles the gold pendant (After J.M. Kenoyer, 1998, Fig. 4.17b).

The signs (apart from the ligatured two short strokes and 3 + 4 short numeral strokes) are comparable to the following Signs found in other inscriptions

Sign 267 Sign 137 Sign 69 variants [It is notable that Sign 137 ligatured (inlaid) with a short linear stroke at the bottom appears on two tin ingots found at Haifa; these finds are presented elsewhere in another section related to metallurgy].

The use of comparable signs together with the bra_hman.i bull (kut.ha_ru, ku_t.a village chief) may be seen in the following inscriptions. It has been noted elsewhere that the bra_hman.i bull pictorial appears without the standard device and may connote the nature of products made by a kut.ha_ru, armourer or rathaka_ra (since the pictorial is also associated with spoked wheels and canopies depicting chariot-boxes, an imagery which recurs on incised weapons).

h085 Harappa seal m-1111 m-1118

As noted by Kenoyer, the use of inscriptions without pictorial motifs of animals indicates an evolution of the writing system of the civilization over time. It should, however, be noted that miniature tablets were found at Harappa even in the early

phases. The script gets virtually standardized in the use of inscriptions on tablets-in-bas-relief. A silver seal with inscriptions exists (M317).

The inscription on the gold pendant, a pectoral found at Mohenjodaro with a pictorial of a one-horned bull and over-flowing vase (perhaps encased in a gold locket) and several inscriptions found on copper/bronze weapons, chisels, celts and on copper plates suggest the following:

- The inscriptions were made by metal-smiths
- The inscriptions were lists of personal property or possessions
- When used on tablets and seal impressions the inscriptions served as lists for trade or bills of lading
- The legacy of recording inscriptions on copper plates continued in the tradition of Bha_rat in the historical periods to record property transactions

Thus, the five signs incised on the gold pendant may connote the list of metal artifacts (as property) possessed by the owner of the pendant.

Gold objects recorded from Mohenjo-daro, Harappa, Chanhudaro, Lothal and Kunal are:bangles/bracelets, pendants, amulets andnecklaces, armlets, ear-pendants, ear-rings, earstuds, beads, brooch, fillets, finger-rings, terminals, caps, netting needles, cone, gold foil/gold leaves, pin, waste pieces of gold.

The terms connoting gold in R.gveda are: hiran.ya, suvarn.a, ja_taru_pa, candra, harita. Gold objects mentioned in the R.gveda are: rukma (golden chain or disk), nis.ka (neck-ornament of gold beads or coins), sraj (gold string interspersed with jewels).

Soma and wealth

Soma, the heavenly nectar of life in golden jars (kalas'a) is the fountain of gold: "Soma flows on for us as winner of the kine, winner of thousands, cars, water, and light, and gold; He whom the Gods have made a gladdening draught to drink, the drop most sweet to taste, weal-bringing, red of hue." (RV. IX. 78.4; Griffith, *RV*, Vol. II, p. 335). Soma is rathajit, hiran.yajit –- one who wins chariots and gold.

gae/ijn! n>/ saemae? rw/ijdœ ix?r{y/ijt! Sv/ijRdœ A/iât! p?vte shö/ijt! ,
y< de/vas?z! ci³/re pI/tye/ md</ Svaid?ó< Ô/Psm! A?é/[m! m?yae/-uv?m! .

9.078.04 Soma flows for us, the conqueror of cattle, of chariots, of gold, of heaven, of water, of thousandfold (wealth), whom the gods have made for (their) drinking, exhilarating, most sweet-flavoured, dropping, purple, causing happiness.

Nis.ka-gri_va connotes a gold ornament worn on the neck, won through soma:

"Svaitreya's people, all his men, have gloriously increased in might. A gold chain Br.haduktha wears, as through his Soma, seeking spoil." (RV. V.19.3; Griffith, RV, Vol. I, p.482). Perhaps, nis.ka was also a currency (RV. I.126.2). Gold is used in the purchase of Soma: S'rautasu_tras: Baudha_yana (6.12-13; 14-15); Bha_radva_ja (10.16.2-18.14); A_pastamba (10.24.1-27.8); Ka_tya_yana (7.7.3-8.25): "After having handed over king Soma to the Soma-seller, the Adhvaryu should ask him: "O, Soma-seller, is your soma available for purchase? He should reply: "It is available for purchase." The Adhvaryu should (offer to) purchas it for ten (objects), (namely) seven cows and the three (objects, that is to say), gold, a piece of cloth, and a she-goat..." (Satya_s._ad.ha, .2)(R.N.Dandekar, *S'rautakos'a*, vol.II, pt. I, p. 129).

The place of sacrifice is also golden (RV. V.67.2; IX.64.20). Even weapons are of gold. "The kanvas sing forth agni's praise together with our maruts' who wield

thunder and wear swords of gold." (RV. VIII.7.32). Gold is won from the earth, washed and cleaned and purified (RV. .117.5).(cf. M.N.Banerjee, "On Metals and Metallurgy in Ancient India", *Indian Historical Quarterly,* Vol. III, March 1927, no. 1, p. 123).

[Ball writes: "Gold is mined for, in quartz veins 3 miles to the north of kandahar city... The gold is sometimes chiselled out in pure granules and sometimes in large nuggets..." (V. Ball, Manual of the Geology of India, III, pp. 208-9). Ball also refers to an old record of the discovery of a gold mine in Afghan Seistan and also notes Bannu, Peshawar, Hazara, Rawalpindi, Jhelam, Ambala and certain Punjab Himalayan princely states such as Kangra as gold-panning centres.]

Gold is won from the rivers; Sindhu was full of golden beds and hence is called 'golden' and 'of golden stream' (RV. X.75.8; VI.61.7; VIII.26.18). "Rich in good steeds is Sindhu, rich in cars and robes, rich in gold, nobly-fashioned, rich in ample wealth". (RV. X.75.8). "This river with his lucid flow attracts you more than all the streams. Even Sindhu with his path of gold." (RV. VIII.26.18).

The path is golden (hiran.yavartani)(RV.I.92.18; V.75.2;3; VIII.5.11;8.1). Praja_pati is the progenitor of the universe and is hiran.yagarbha (the golden foetus): "in the beginning rose hiran.yagarbha, born only Lord of all created beings. He fixed and holdeth up this earth and heaven what God shall we adore with our oblation." (RV. X.121.1; Griffith, *RV*, Vol. II, p. 566).

Gold (hiran.yam) was the objective of the Vedic singers (RV. VI.47.23; VII.78.9). The prayers refer to gold that glitters (RV. X.107.7), that gives wealth (RV. II.34.11; VII.66.8), that is self-luminous (RV. V.87.5). The singers seek: "The Sea and all the Deities shall give us him with the golden ear and neck bejewelled. Dawns, hasting to the praises of the pious, be pleased with us, both offerers and singers." (RV. I.122.14; Griffith, *RV*, Vol. I, p. 169)

Gods Indra, Mitra, Varun.a etc. were often described as golden in hue (RV. I.46.10; I. 167.3; I.139.2; II.35.10; IV.3.1; IV.10.6; VI.16.38; VII.45.2; X.20.9) driving from golden seats (RV. IV.46.4; VIII.5.28; VIII.22.9) in golden chariots (RV. I.30.16; I.35.2; 56.1; 139.4; IV.1.8; IV.44.4; IV.44.5; VI.29.2; VIII.1.24; VI.66.1; VIII.33.4; VIII.46.24), having shafts or poles (RV. I.35.4; 5; VIII.5.29), wheels and axles all bright as gold (RV. I.64.11; 105.1; 139.3; 180.1; VI.56.3; VIII.5.29) with golden reins for the horses (RV. VIII.22.5) who had golden manes (RV. I.122.14) and were bedecked with golden ornaments.

Gods As'vins and Maruts and the asuras alike adorned themselves with magnificent jewellery using gold rings (RV. VIII.32.29) gold ear-rings (RV. VII.56.13; I.166.10; I.64.11; V.54.11; II.34.3; VI. 16.38) golden necklets and armlets (RV. VII.56.13; I.166.10; I.64.11; V.54.11; II.34.3; VI.16.38). "Your rings, O maruts, rest upon your shoulders, and chains of gold twined upon your bosoms. Gleaming with drops of rain, like lightning-flashes, after your wont ye whirl about your weapons." (RV.VII.56.13; Griffith, *RV*, Vol. II, p.55)

References to pur (urban settlement), ayas (metal), and samudra (sea) in the R.gveda indicate that the culture was not exclusively pastoral but had sea-faring, trading activities and used metals to build-up urban settlements:

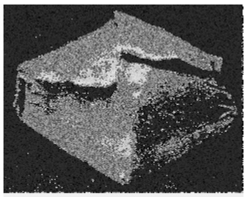
varma si_vyadhvam. bahula_ pr.thu_ni purah kr.n.udhavam a_yasi_radhr.is.t.a_
(RV. X. 101.8)

'stitch ye the coats of armor, wide and many; make metallic forts, secure from all assailants'.

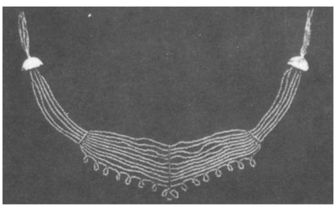
ra_yah samudra_ns'chaturo asmabhyam soma vis'vatah a_ pavasva sahasrin.ah
(RV. IX. 33.6)
'from every side, O Soma, for our profit, pour thou forth four seas filled full of riches thousandfold'.

Sources of gold: Coimbatore (Hadabanatta, Kavudahalli and near Porsegaundanpalayam), Wynaad and Kolar (Marshall 1931: 674). “South of the Caucasus, in Armenia, the famous metal workers, the Chalybes, are credited with rich mines. This probably means the deposits near the Taldjen River, close to Artwin... The Muruntau mountains in the Kyzyl Kum desert has the largest deposit of gold (Forbes 1971: 166; Kalesnik and Pavlenko 1976: 202)... The discovery of the famous Fullol Hoard in the Hindu Kush of northern Afghanistan (Tosi and Waradak 1972: 9-17) contained a number of gold objects with Mesopotamian and South Turkmenian motifs. This proves that the region (the Oxus basin—northern Hindu Kush) was as important to the Middle East for gold as it was for lapis lazuli. Incidentally, the Harappan trading posts at Shortugai are also in the same region (Francfort and Potter 1978:29).

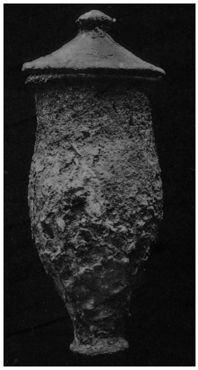
Metals. Gold is known at Mokar, Afghanistan. (T.A. Wertime, **Science** 182, 1973, p. 884). "X-ray micro-analysis has shown that inclusions in the bead are composed of an alloy of platinum-iridium-osmium and gold. These three metals form rare alloys, found mostly in placer deposits...supplies from this area could have joined caravans carrying lapis-lazuli using Helmand valley route via Shahr-i-Sokhta to the Persian gulf and then have arrived by the ships carrying the lapis, carnelian, tin and gold from Meluhha to Sumer." (K.R. Maxwell-Hyslop, Sources of Sumerian Gold, ***Iraq***, XXXIX, 1977, p.p.85-86).



Lothal: microbeads of gold

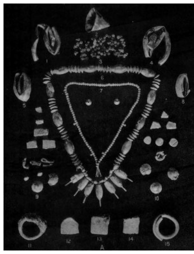


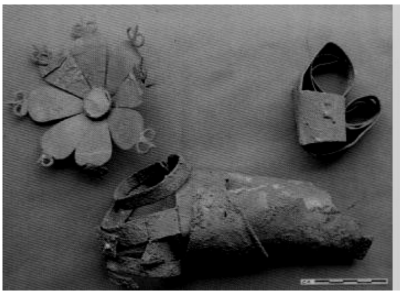
Gold bead; Early Dynastic necklace from the Royal Cemetery; now in the Leeds collection.

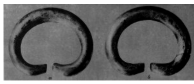




Gold jewellery, Mohenjodaro (After Marshall, Pl. CXLVIII).The jewellery was found in a silver vase. The large necklace is made up of barrel-shaped beads of a translucent, light-green jade. Each jade bead is separated from its neighbours on either side by five disc-shaped gold beads, 0.4 in. dia made by soldering two cap-like pieces together. Seven pendants of agate-jasper are suspended by means of a thick gold wire. The pendants are separated one from another by a small cylindrical bead of steatite capped at each end with gold. The smaller necklace (No. 7) inside the large one is made up of small globular gold beads, all of which are cast. The spacers were made by soldering two of these beads together, and it is probable that the beads were originally strung into a bracelet of two rows. The two bangles (Nos. 1 and 4) were each made of thin sheet gold wrapped over a core (dia. 3 in.) No.2 is a conical gold cap (1.3 in. high) beaten out from a plate of gold; it is perhaps a hair ornament.



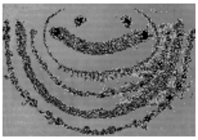




Two silver bracelets were also found with this hoard. (Marshall, Pl. CLXIV)

Silver vase, Mohenjodaro (After Marshall, Pl. CXLVIII). The silver vase contained gold jewellery.

Jewellery, Mohenjodaro (After Marshall, Pl. CXLIX). No.3 is a gold bracelet. (Other



bracelets are made of blue glazed faience or a vitrified clay, dark brown or black on the surface, sometimes with very minute inscriptions). The gold spacers found with these beads show that they were originally threaded in six rows with semi-circular terminals of gold. The small beads were cast and the spacers cut out of sheet metal. No.4 below this bracelet is made of minute gold beads, globular and cylindrical in shape, interspaced with tiny globular beads of steatite, perhaps of original blue glaze. The small cylindrical pendants on the necklace are made of gold and glaze; the loops of thin gold ribbon wire. No.5 is of beads of various coloured stones, such as riband-jasper and carnelian, alternating with small gold beads; some beads are capped with gold. No. 6 is a string made of gold and glazed steatite cylindrical beads in five rows held by eight five-holed spacers. No. 7 is of flat gold beads, beads of onyx, green felspar and turquoise matrix and small globular beads. Nos. 1 and 2 are dome-shaped caps of the pendants with small gold loops inside. (After Marshall, Pl. CXLIX).

Kunal: Silver ornaments

Gold jewellery (two views) found in a Royal Tomb, Ur; the eight-petalled star is a motif found also in Kunal, Haryana, India.





Partly excavated burial of a lady-in-waiting to a Sumerian royal family of 2500 B.C. was moved intac from Ur to the University Museum of Pennsylvania. Amid the rich ornaments of gold may be seen the teeth of their wearer. From: Samuel Noah Kramer,

1957, The Sumerians in: Old World Archaeology, *Readings from Scientific American*, San Francisco, WH Freeman and Co.

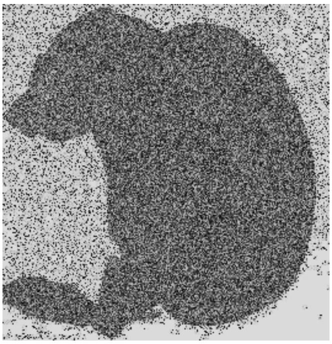
Kunal: spiralled silver bangles

Discular beads of gold with axial perforation, Mature Harappan, Lothal. The gold disc should indeed be called the nis.ka the gold standard of the Sarassvati Sindhu civilization. (Nis.ka is mentioned in Vedic texts: R.gveda): RV. 7.47.15 nis.kam va_ gha_ kr.n.avate; interpreted as a_bharan.avis'es.a_n (RV 1.126.2); TMB 18.1.14 refers to the silver nis.ka: rajato nis.kah: rajatanirmitolan:ka_rah; nis.kagri_va = necklace-necked (RV 5.29.3)].

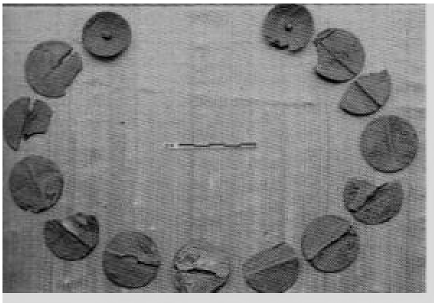
Kunal. Period Ic Necklace of gold beads. (Plate IIIb S.P. Gupta, 1996, *The Indus-Sarasvati Civilization*, Delhi, Pratibha Prakashan).

Kunal. Period Ic. Arm-band of silver. (Plate IIIc, S.P. Gupta, 1996, *The Indus-Sarasvati Civilization*, Delhi, Pratibha Prakashan).

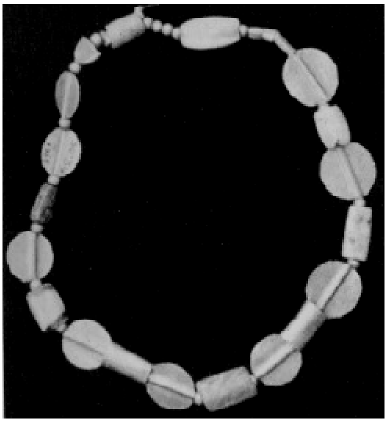
Kunal (29*30'N and 75*41'E), Ratia tehsil, Hissar Dist., Haryana (12 kms. from Bhuna town). Period: 3016 to 2837 BC. A small area of 1.2 hectares with a vertical deposit of over 3 m. The radiocarbon dates place the site between ca. 3016 and 2577 BC (Lal 1997, p. 84). Copper arrow-heads and fish-hooks; micro-beads of chalcedony. Red ware bearing painted designs in two colours (black outline filled in with white) are characteristic of a number of sites along the Sarasvati_ valley. Potsherds of Hakra ware (Cholistan) were also found at the site. In the next period, painted motifs on pottery included peacock and pipal leaf, typical of the designs of the Mature Harappans. A globular jar of red ware yielded silver ornaments wrapped in a silver sheet: two tiaras (small and large), each with a large fully-opened flower



having petals topped with a decoration like the Greek letter 'alpha' (Khatri and Acharya, 1995: 86) Along with these tiaras was a multi-spiralled armlet which is similar to the armlet worn by the bronze statue of the 'dancing girl' from Mohenjodaro. In another house were found a large number of gold/silver-beads: cup-shaped, barrel-shaped, discular; shapes which are characteristic of the Mature Harappans. Discular beads of silver with perforation along the diameter found in Kunal (Hissar, Haryana) have occurred at Mature levels at Lothal, in gold. Other parts of the site yielded beads of lapis lazuli, carnelian, faience. Copper objects were produced at the site as evidenced by the discovery of a terracotta crucible with molten metal still sticking to it. The objects included: axes, fish-hooks, spearheads, iverted 'V-shaped' arrow-heads, coiled cones and coiled finger-rings which are characteristic of Mature Harappans. Seven seals (six of steatite and one of shell) were found. They are square-shaped with a perforated knob at the back, again anticipating the Mature Harappans. The seals bear only geometric motifs and without any inscriptions.

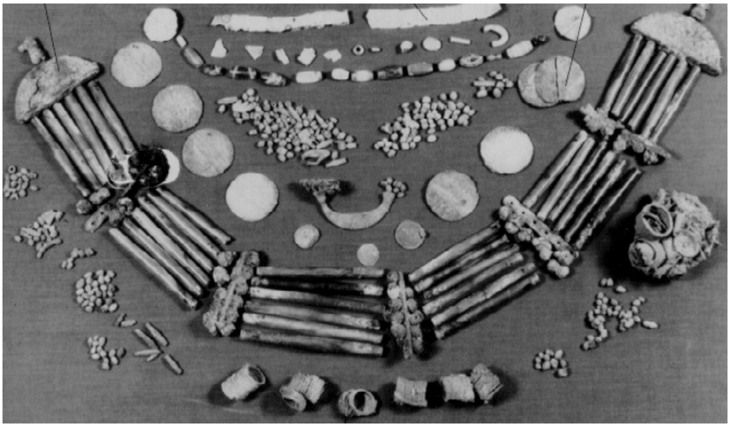


Discular beads of silver with axial perforation, Early Harappan, Kunal [Similar to the gold discular beads found at Lothal]



Discular beads at Mohenjodaro: necklace made up of paper-thin flat gold disc beads, interspersed with beads of onyx, amazonite (microcline), turquoise, and banded agate. Some beads have gold finials, and additional small spherical gold beads are used as spacers. The necklace fragment is only half of the original ornament, which was divided between India and Pakistan in 1947. (Gold

disc beads 1.49 cm. Long and 1.42 cm. Wide; Mohenjodaro HBR 4212 a (d); Mohenjodar Museum MM 1369; Marshall, 1931, pl. CXLIX.7 (complete necklace). Hoard No. 3, HR Area. Room 8. House VIII. Block 2, Section B. After Kenoyer, J.M., 1998, cat. No. 56).

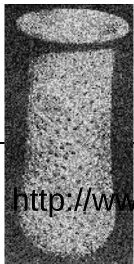


That the disc beads of gold and silver are found at Kunal, Mohenjodaro and Kunal indicate the close links among the smiths, perhaps of a cooperative guild (cf. the term used in the R.gveda, sama_na u_rve), of the civilization extending over a vast area along the River basins.

Allahdino: jewelry hoard: silver disc beads (similar to those found in Kunal) and other ornaments: coiled silver wire toe rings or finger rings with 14 to 16 spirals of wire (Department of Archaology, Karachi, EBK 2101 to 2105; material: silver); necklace (?belt) of carnelian and copper/bronze beads; crumpled gold fillets and other gold ornaments.

Perforated jar (Use in gold purification, parase). Its use will be further explained in the lexicon. (Pots and pans)

Potable gold: 'golden fleece' and replicating age-old processes

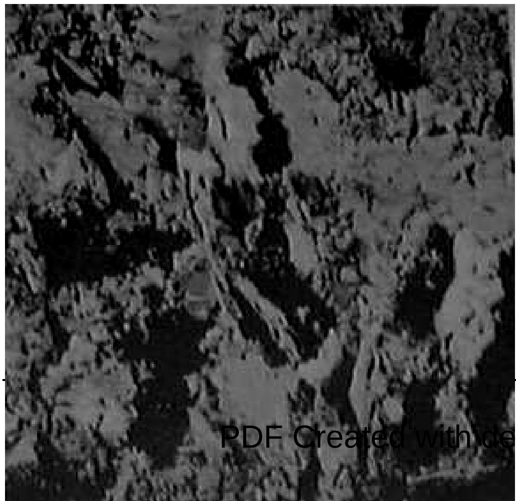


"...the origin of the legend of the Golden Fleece...The Argonaut legend was known to Homer...the search was for gold and woolled sheepskins were suspended in a stream to collect gold dust from

running water. The skin was then suspended between trees to allow it to dry. Support for this view (which was first put forward by Strabo (xi.2.19; who died in AD 19) is gained from the statement in the legend that, when Jason snatched the golden fleece ‘from the shimmering of the locks of wool there settled on his fair cheeks and brow a red flush like a flame.’... finer fleeces tend to have more grease; gold particles being not easily wetted, would stick readily to the grease. Sand particles on the other hand are wetted and would not stick (Barnes, J.W. 1973: Jason and the Gold Rush, Proc. Geol. Assn., 84, 482-5). (M.L.Ryder, The last word on the golden fleece legend? in: Oxford Journal of Archaeology, Vol. 10, No. 1, March 1991, pp. 57-60).

Alchemical tradition is documented in a text dated to the mid-second millennium BC in Mesopotamia; this is reminiscent of the Rigvedic agnis.t.oma which lasts for days and nights!

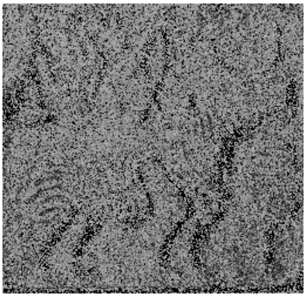
“For 5 shekels of pappardillu stone you mix one-third mina of mountain honey, 10 shekels of TA, one su_tu of milk, 4 shekels of red alkali and one-half sila of wine...You test on glowing charcoal... you pour into a stone bowl of algamis’u-stone (steatite)...lute with dough...you heat it for a full day on a smokeless fire. You take out and..for five days, it is (not?) reliable. You soak it in (liquid)...You boil alum and...in vinegar. You steep (the stone) in lapis lazuli-coloured liquid and place it in the fire...Property of Nebuchadnezzar, king of Babylon.” (Text 1, Bab. K. 713; A. Leo Oppenheim, RA, 60, 1966, pp. 29-45).



Ams’u! Leaf formation on gold from the Mother Lode, Nevada country, California



(*Encyclopaedia Britannica*). "Gold in rocks usually occurs in invisible disseminated grains, more rarely as flakes large enough to be seen and even more rarely as masses or veinlets. Crystals about 2.5 cm. (1 inch) or more across have been found in California."



Banawali. Seal found in the metal-worker's dwelling. Jewellery and weighing pan of a scale. A number of weights were also found. (After R.S. Bisht, 1982, Excavations at Banawali, 1974-77, in: Gregory L. Possehl, Harappan Civilization, Delhi, Oxford and IBH, p. 119, Pl. 10.16, 10.17).

Electrum

Arthas'a_stra states: pure and impure silver may be heated four times with copper sulphate, mixed with powdered bone (asthituttha) again four times with an equal quantity of lead and again four times with dry copper sulphate (sushkatuttha), again three times in skull and lastly twice in cow dung. (Stanza 88). The use of the skull which is calcium phosphate is a cupellation process for purification of silver. Galena was first smelted to crude lead and silver concentrated by a process called Pattinson Process. The proess is based on the fact that i fused argentiferous lead is cooled, a point is reached when nearly pure lead separates in crystals. If crystals of lead were withdrawn by perforated ladles the remaining liquid alloy would become increasingly rich in silver. About 7/8ths of the original lead is removed by this process and the rest of the lead is reoved by cupellation process. Separation of silver and other impurities from gold (electrum) was invented before Amarna age, possibly during or shortly after Ur III period (ca. 2200-2000 B.C.)

"...ancient empires... began to concentrate upon importing the crude metals from these distant smelters (of Egypt). The rulers of the city-states would then release the imported raw material to their own metal-workers for finishing... For the efficient extraction of metals from their ores some form of furnace is needed and, for certain purposes, the fire must be forced by draught. In the simplest operations of smelting, the pieces of ore are mixed in layers with the fuel, and the metal is afterwards collected in a lump from the hearth... Metal-workers were among the earliest specialists in craftsmanship. Neolithic farmers or their women had woven and spun, made their own shoes and pots, and dug their own flint, but the advent of the smith ushered in a new era, in which the urban civilizations of the great river valleys rapidly developed. Thence itinerant smiths ventured into the barbarian fringe to seek ores, and thus spread knowledge of the working of these coloured stones. The awe in which smiths were held is reflected in innumerable legends...

"Strabo and others report that, in the Caucasus, alluvial deposits were worked by washing over a layer of fleeces. The gold particles would adhere to the grease in the wool--hence the basis of the legend of the Golden Fleece... In cupellation, lead is added to the crude gold, and the metals fused together in a porous clay crucible or cupel. The lead and other base metals are oxidized by a current of air. The resulting molten litharge, containing all the base-metal oxides, is partly blown off by a blast of air, and partly absorbed by the walls of the cupel, leaving a button of refined gold or, if silver was originally present in the ore, of gold alloyed with silver. Agatharchides (second century BC) is quoted by Diodorus (III, 14, 3-4) as describing the removal of silver as well as the base metals by a modification of the cupellation process: 'The workers place the crude gold in a clay vessel, and add a mass of lead, a little salt and tin, and barley husks. Then it is closed with a tight-fitting lid, sealed with lute, and heated for five days and nights in a furnace. After a suitable interval for cooling, nothing is found of the other materials in the vessel, but only pure gold' (Abbreviated).

"Evidently, at any rate in the first stage of this operation, while the access of air is prevented, the carbonaceous barley would act as a reducing agent. In this period,

the metals would be fused and the silver converted to silver chloride by the salt. Later, we must suppose that air is admitted, perhaps through cracks; the barley husks would then burn away, and the base metals would be oxidized and absorbed by the crucible. Perhaps the lid is finally removed, and the heating continued for a short period longer to bring about the cupellation... Silver and lead were closely associated because both were obtained from the same mineral, galena. This is predominantly lead sulphide, but usually has a small proportion of silver. Its occurrence is widespread, and it is often associated with copper ores. Its brilliant metallic appearance may have attracted the attention of the early copper-smelters. The few galena depsits of Egypt were worked for eye-paint only, and in any case the lead produced later from these ores contained little silver...

"It is doubtful whether the rich deposits of India, Afghanistan, and Persia played a part in the ancient Near East, where much more importance must be attached to the many galena deposits rich in silver in the Armenian mountains, and in the central part of western Asia Minor. Classical tradition and archaeological evidence both point to north-eastern Asia Minor as the birthplace of silver. The 'land of the Chalybes', so important an early centre of metallurgy, was the mining district of the Hittites, whose very capital bears a name written with the ideogram for silver. Asia Minor held an almost complete monopoly of silver production, and Sumerian and Assyrian cities sent their merchants to the Hittites to acquire the silver and lead produced in that country.

"Earlier potentates like Sargon the Great and Gudea, ruler of Lagash, dispatched expeditions to acquire these metals in the 'silver mountains' of Armenia. The Cappadocian tablets (ca. 2000 BC), however, show that there were at that time permanent settlement of Mesopotamian merchants in the land of the Hittites, buying crude and refined silver, pure lead, and pigs of lead, all in sealed in containers to prevent pilfering during transport. From the accounts, it is evident that several qualities were produced. The silver was usually sold in bars, and about four times as much silver as lead was sent to the home country...

"By the first millennium BC, silver and lead were common metals all over the Near East, except in Egypt, where the phase of metallurgy was delayed for another 400 years. The amounts of these metals taken in tribute and booty by the Assyrian king Tukulti Ninurta II (889-884 BC) afford evidence of extensive production. Between 400 and 1000 kg of lead and 100 kg of silver were captured during his expedition into the northern mountains, which shows that the region between Lake Van and Lake Urmia was already producing them in large quantities. In Egypt, on the other hand, though importation had begun, the comparative value of silver to gold was still as high as 1:2 at the time of the Persian occupation. The Persian victory of Egypt took advantage of this strange situation, and enriched himself by introducing a silver coinage into the country.

"Supplies of silver became plentiful in Egypt only in Hellenistic times, when the price of silver dropped to only one-thirteenth of that of gold. The production of silver and lead was responsible for the introduction into general metallurgy of the methods of working sulphide ores and of cupellation. The working of galena entails partial desulphurization by roasting, followed by reduction of the product, litharge (lead oxide). A simple hearth-furnace or a sloping trench sufficed. The fule and ore were thoroughly mixed together, or built up in alternate layers. Natural or artificial blast supplied the necessary air. A proportion of the sulphur escaped as sulphur dioxide, but some remained as unchanged galena and lead sulphate. When the correct stage of desulphurization was reached, the temperature was raised, and the litharge, lead sulphate, and galena interacted to form lead, which collected at the bottom of the furnace, while the remaining sulphur escaped as sulphur dioxide. The charcoal added as fuel would prevent re-oxidation. The product was a lead-silver alloy harder than pure lead; it contained many impurities, such as antimony, copper, tin and arsenic. This ancient process combined the two modern stages of roasting and reduction. Though the technique was comparatively simple, the chemical reactions were correspondingly complex, and the ancient metallurgist had not yet sufficient knowledge to control them fully. The inevitable result was a small yield... silver was obtained from silver-bearing lead by cupellation. The litharge slag could be used as such, or reduced with charcoal to lead. Finds of pure

silver at Ur, at Troy (six bars of pure silver), and at other places, as well as historical data, lead us to conclude that cupellation was invented in north-eastern Asia Minor in the first half of the third millennium BC.

"The fining-pot and the drossing of base metals are frequently mentioned in the Bible (Prov. xvii.3; Jer. vi.29-30; Ps.xii.6). By about 60 BC, cupellation was well known. Liquation, a method of extracting gold and silver from other sources such as certain crude coppers, was perhaps also known at this time in the Near East. It involved alloying the crude metal with lead and slowly melting it. The lead flowed away with the precious metals in solution, leaving a porous mixture of the remaining base metals. Liquation was followed by cupellation... The silver:gold value-ratio gives an interesting indication of the supply of silver. It was comparatively high in the earlier periods in Mesopotamia (1:8), and rose still higher to 1:6, in the reign of Hammurabi, perhaps because of disorder in Asia Minor and Armenia. It fell soon afterwards to 1:10, and remained at that level for a very long period. In Neo-Babylonian and Persian times the ratio varied between 1:12 and 1:13." (Charles Singer, et al (eds.), ***A History of Technology***, Oxford Clarendon Press, 1954, pp. 576-585).

"The metal found at the necropolis of Susa, with or without a cloth covering, proved to contain 92.12 percent pure copper, without iron, sulfur, lead, zinc or manganese, but with traces of nickel. Objects from Tello have yielded similar amounts; at Tell-el-Obeid, copper in most cases exceeds 95 percent of the total. The same results were obtained by R.C. Thompson in the cases of objects from Eridu. Thus pure copper, and not merely antimonial bronze, as has been claimed, was in fact in existence in the early centuries of the third millennium. Since copper did not exist in Sumer, its presence there indicates trade relations with the Caucasus and Anatolia.

"Bronze is constantly in evidence after the time of Gudea; in most cases it is tin-bronze or antimonial bronze. Elam, which was particularly noted for metalworking has left remarkable bronze monuments dating from the second half of the second

millennium BC, the most striking being the statue of Queen Napir-Asu. This statue was cast in two halves, and was then filled with molten bronze forced in with a metal block to cause it to fill the interior completely (this part of the operation failed). The destroyers of the monument were able to remove the head and one arm; the statue, even with the head and one arm missing, still weighs more than 3,960 pounds, and is five feet tall. It must have been extremely difficult to maintain successfully the metal in each crucible at a constant temperature (they were poured out one after the other).

"Gold from the north and from Egypt, as well as silver and the other metals, has been discovered in large quantities in the royal tombs of Ur. The Sumerians already knew how to refine it and remove its impurities. Certain objects from the royal tombs at Ur--the headdress of Meskalamdug, for example--are very solid, but very often gold was used simply for 'gilding'. At Khorsabad, for example, the bitumen-coated trunks of palm trees were covered with a bronze facing that simulated the scales of the palm tree; then gold leaf, annealed to make it flexible, was burnished and nailed to this bronze facing with small nails.

"Silver, more common than gold, was used in the same manner; before coins came into existence it was a unit of exchange used for the payment of purchases, as by barter. Refining of gold was necessary in view of the impurities this metal contained; King Burraburias of Babylon complained to Amenhotel IV (circa 1370-1352 BC) that the gold received from him contained three-quarters of its weight in impurities. The fine gold used in the objects found in the tombs at Ur was approximately 75 percent pure gold. The refining method used was a variant of our cupellation, as is indicated by the purification of five minas of gold by means of successive stages in the furnace; on the first round the gold was reduced to four minas, five shekels, on the second to three and two-thirds minas. The Mesopotamians knew how to alloy and harden gold, which permitted it to be used for weapons." (Maurice Daumas, opcit, p. 133).

Purification of electrum: ancient metallurgical processes related to gold, silver, lead

Sources of Sumerian gold (2nd half of 3rd millennium BC) "...(gold) bead...alloy of platinum-iridium-osmium and gold...found mostly in placer deposits.. At Muteh...NW of Isfahan..most important deposits of gold known... Damghan lies on the lapis-lazuli trade route to Mesopotamia... lapis mines along the Kokcha river in the Afghan Hindu Kush... apart from possible Arabian and Indian gold.. Gold is known at Mokar and supplies from this area could have joined caravans carrying lapis-lazuli using the Helmand valley route via Shahr-i-Sokhta to the Persian gulf and then have arrived by the ships carrying the lapis, carnelian, tin and gold from Meluhha to Sumer." (K.R. Maxwell-Hyslop, Iraq, XXXIX, 1977, pp. 83-86).

Pliny described electrum as an alloy of gold and silver with one part of silver to four of gold. Normally, in mineralogy, argentiferous gold containing 20-25 per cent of silver is referred to as electrum. "Many of the rare analyses of Mesopotamian 'gold' show that it is in fact electrum, but whether a natural or a deliberate alloy is not invariably clear... Silver may only be separated from gold by a complicated process; but base metals may be slagged off by repeated meltings of native gold in an oxidizing atmosphere, routine in many goldsmithing techniques. Natural electrum can have a susbtantial copper content... Gold, whose distribution is almost universal, occurs either in veins of quartz rock (reef gold) or in alluvial sands and gravel (placer gold); a distinction found in the textual sources (hura_s.um s'a abnisu; hura_s.um s'a ma'e_s'u)... In its native state gold is always alloyed with silver in proportions that vary greatly; sometimes also with copper and traces of iron and other metals... Reef gold occurs as irregular masses in quartz veins or lodes. The mining process consists first of freeing the gold particles by crushing and sifting the ore, then of separating the gold by making use of the metal's higher density. The classic description of gold-mining in antiquity is that by Agatharcides, preserved by Diodorus Siculs (iii.12-14, 3-4) who, in the second century BC, visited and graphically described the rigours of gold-mining in Egypt (cf. Lucas 1962: 224ff.)... (Royal cemetery at Ur)... a spearhead (U.9122) has 30.30 per cent

gold, 59.37 per cent silver, and 10.35 per cent copper (Woolley 1934: 294: table III). The famous rein-ring from RT 800 (Pu-abi) has an equid of electrum (whether natural or artificial is an open question), comprising 65.60 per cent gold, 31.45 per cent silver, and 2.65 per cent copper, whilst the ring on which it stands is virtually sterling silver (93.5 per cent silver, 6.10 per cent coper, and 0.08 per cent gold). Bowls from PG 755 are also gold-silver-copper alloys (Woolley 1934: 294)... Cupellation will remove metals from silver or gold, but by itself will not remove silver; adding salt enables silver to be removed from gold (cementation)...

Agatharcides (2nd century BC) describes how in Egypt gold-bearing ore was found and washed until more or less pure gold dust remained. This dust was put "into earthen pots. They mix with this a lump of lead according to the mass, lumps of salt, a little tin and barley bran. They put on a closely-fitting lid carefully smearing it with mud and heat it in a furnace for five days and nights continuously; then they allow the pots to cool and find no residual impurities in them; the gold they recover in a pure state with little wastage. This processing of gold is carried on round about the most distant boundaries of Egypt." (Healy 1978, 154) "The procedure was tested in 1974 (Notton 1974) with an alloy of copper and silver containing 37.5% of gold. It was found that heating the pots filled with the alloy and salt gave the highest gold recovery rate of 93%. Including tin, lead or charcoal reduced the efficienty to less than 80%. Healy concluded that the account given by Agatharcides 'seems to be an example of the conflation of at least two processes' (154)..Arthas'a_stra mentions salt among the articles necessary for purifying gold: KA 02.14.23 mu_kamu_s.a_ pu_tikit.t.ah karat.ukamukham na_li_ sam.dam.s'o jon:gani_ suvarcika_lavan.am tad eva suvarn.am ity apasa_ran.a ma_rga_h". (Diodorus—III,14,3-4; loc. cit. Harry Falk, Refining gold in ancient India : ad JUB 3.17,3 in: *Acta Orientalia* 1997: 58, 47-51).

Barley husks would burn away and the base metals oxidized and absorbed by the crucible (silver is converted to silver chloride by the salt.) (R.J. Forbes, in: Singer et al., *A history of Technology*, 1954, pp. 573-587).

For cupellation, the gold is alloyed with lead in a special clay vessel, known as a cupel, and the product oxidized by a strong current of air blown into the surface of the molten metal. The base metals are consumed, or drossed, as the oxides formed are absorbed by the porous walls of the cupel, whilst gold and silver survive. Precisely what form cementation took before the classical authors offer descriptions of it (Diodorus Siculus, III.xiv.1f. (after Agatharcides); Strabo, III.ii.8) is a matter of continuing debate. Notton (Notton, JHF, 1974, Ancient Egyptian Gold Refining: a reproduction of early techniques, *Gold Bulletin*, 7(2), 50 ff.) experimented with the method described by Diodorus Siculus and it proved very successful. A series of tests were conducted in a nine-carat alloy (in the absence of a suitable gold ore). In the first, salt and the gold alloy were smelted under various circumstances. After five days heating at 800deg. C, gold recovery was high. It was less so when salt, brick dust, and the alloy were used and also when tin and lead were added in two different ways. The presence of tin to a greater extent, lead to a lesser, inhibited the recovery rate. On the evidence of these experiments, earlier suggestions about ancient methods of cementation gain extra credence. The Sardis excavators argued that 'the gold is hammered into thin sheets, which are then stacked in a vessel with layers of dry 'pickling mixture' like common salt or alum, and heated for a long time, c. 700 deg. C. Silver especially combines with salts and the gold is left pure (Ramage A. 1970, 'Pactolus North' in GMA Hanfmann and JC Waldbaum, 'The Eleventh and Twelfth Campaigns at Sardis' (1968,1969), *Bulletin of American Schools of Oriental Research (Jerusalem and Baghdad)* 199: 22-3) .

Comparable techniques may have been current in Mesopotamia by at least the Old Babylonian period, to judge from the appearance in the Mari texts of the term lurpianu (a salt?), which is associated with the preparation of gold in contexts suggesting cupellation or a comparable process (Limet.H., 1986, Textes administratifs relatifs aux metaux (Archives Royales de Mari 25, Paris): 288)... The role of assaying in ancient Mesopotamia, in which a sample is removed for analysis, is no clearer. Assay by fire, used in a qualitiative not a quantitiave way, is described in the Leyden Papyrus (X, no. 3: Oddy, W.A., 1983, Assaying in Antiquity, *Gold Bulletin*, 16(2), 52-9), but how early such tests were used is

unknown: ‘If the gold is pure, it keeps the same colour and remains pure like coinage after heating. If it appears whiter it contains silver; if rougher and harder, it contains copper and tin; if black and soft, it contains lead.’ The use of a touchstone (Lapis Lydius, i.e. black chert) to test the relative purity of gold (its approximate carat value in modern terms) is attested by classical authors from at least the sixth century BC (Theognis, 417; Pindar, Pythian, X.67).

Theophrastus (de Lapidus,45) attributes them to the river Tmolus in Turkey. In this case it is siliceous schist (flinty state), black in colour, usually for this purpose deep black, fine-grained; but other black stones may be used.. Streaks are taken from gold alloys of known, graded composition for comparison with streaks taken from the metal to be assayed (cf. Oddy 1983; Moore and Oddy 1985)... Eluere (1986: 59) has shown that two stones from a late third-millennium grave at Telloh (called a ‘goldsmith’s tomb’) exhibit no traces of gold and are not suitable for use as touchstones; the same is likely to be true of an example identified at Larsa in a ‘jeweller’s hoard’ (cf. Arnaud et al. 1979: 20-1, 23, fig.8). These haematite objects are either weights or burnishing stones, as may be the case with a gold-streaked stone reported from Assur (Pedersen 1985: 123, n.7); this type of stone is not appropriate for use in a touchstone...

Sumerian literary texts refer to gold from Aratta (Pettinato 1972: 79). Gudea records receiving gold from the mountain of Hah(h)um (Statue B. col. VI. 33-5; Liverani 1988), taken to lie in that part of modern Turkey near Samsat on the Upper Euphrates, and from Meluhha. In far less explicit terms the names of various mountains reputed to have gold sources are also recorded (Limet 1960: 94). Various texts refer to the almost mythical land of gold known as (H)arallu, perhaps somewhere in the Iranian hinterland (Komoroczy 1972; Groneberg 1980: 20). Shu-Sin (c. 2037-29 BC) refers to gold from ‘Su-land’, probably in western Iran, though its location is still open (Edzard, D.O., 1959-60, Neuen Inschriften zur Geschichte von Ur III unter S’usuen, *Archiv fur Orientforschung (Graz)* 19, 1-32): 16-18) and from (Mar)daman, possibly identical with Mardin in south-east Turkey (ibid.: 7; Edzard and Farber 1974: 118).

Documents relevant to the Dilmun, trade in the later third and earlier second millennium BC indicate that some gold was still reaching Ur up the Gulf at this time, but whence it came, perhaps Meluhha, is not stated (Oppenheim, A.L., 1954, The Seafaring Merchants of Ur, *Journal of the American Oriental Society* (New Haven, Conn.) 74, 6-17: 7; Leemans,W.F. 1960, *Foreign Trade in the Old Babylonian Period as revealed by texts from southern Mesopotamia* (Leiden): 120-1, is more cautious; cf. Leemans, W.F., 1957-71, Gold, Reallexikon der Assyriologie und vorderasiatischen Archaologie (Berlin) 3, 504-31). The renowned resources of Egypt and Nubia (cf. Lucas 1962: 224-8) contributed most certainly in the fourteenth century BC to Mesopotamian royal gold holdings (Edzard 1960; Wilhelm 174). Then, for the first and only time in its history, Babylonia may have adopted the gold standard and large amounts of gold came from Egypt to assist Kurigalzu I in his major building projects (Brinkman 1972: 274-5; Muller 1982; Powell 1990: 79-82). Hittite inventory texts of the thirteenth century BC record gold from Babylon and Lukka (Lycia) (Kosak 1982: 195)...

Ur was the port of entry for copper into Mesopotamia during the Laras Dynasty. The copper was imported by boat from Telmun (Bahrain)...UET V 292...listing of merchandise...'red' gold, copper, lapis lazuli in lumps, various stone beads, ivory-inlaid tables, fish-eyes...The copper (called URUDU) came in large quantities (UET V 796 specifies more than 13,000 minaz of copper and often in ingots termed gubarum which weighed upto 4 talent each (UET V 678)...The ingots are also sometimes qualified as damqu (UET V 22,81)... (Oppenheim, A.L., 1954, The Seafaring Merchants of Ur, *Journal of the American Oriental Society* (New Haven, Conn.) 74, 6-17).

If we accept that Meluhha was a reference to India, it is clear from the economic texts of Mesopotamia that copper was an Indian export, not an import item, in Sargonid times. Sumer also received from Meluhha carnelian beads, perhaps from Saura_s.t.ra.

So far as is known, there were no sources of gold exploited in antiquity in Mesopotamia, Syria, or Palestine; but the metal is widely reported on the periphery of this region (Maxwell-Hyslop 1977): in Turkey, where there is a preponderance of sources in the west and south-west (Jesus 1980: 82 ff.); in Egypt and Nubia (Lucas 1962: 224-8); in considerable quantities in western and southen Arabia, not least in Ophir (I Chron. 29: 4; 1 Kgs. 10; Job 22: 24; cf. Maisler 1951), being well known to both biblical and classical auhors (Diodorus Siculus, III, xlv. 6 ff.; Strabo, xvi. 4,18,22: Periplus, 36, etc.); in greater Iran, notably in the north of the country and eastwards into Transoxiana and the region of modern Afghanistan, where there are substantial vein and placer deposits (Dunlop 1957; Chmyriov et al. 1973). Diodorus Siculus (II.xxxvi.2) and Pliny (Natural History, xxiii.66) refer to rich soures in India, though traces are no longer easy to detect (Allchin 1962; Ratnagar 1981: 106 ff.) With so wide a range of potential sources within her orbit, many of them in regions whence she is known to have received other metals.

Mesopotamia is likely to have had a variety of choices if and when supplies were for some reason blocked in any particular locality. It will be immediately clear that the ancient texts already considered indicate import at various times from all the potential sources zones listed here.

The wide distribution of potential sources does not ease the quest for a scientific method through which Mesopotamian gold sources might be ‘finger printed’. It is known that platinum group elements (hereinafter called PGE) such as ruthenium, rhodium, palladium, osmium, iridium, and platinum occur in gold objects from the ancient Near East both in solid solution and as inclusions.. On the evidence of the inclusions of the platiniridium alloy in a number of Sumerian and other ancient gold objects, notably Lydian gold coins supposedly of gold from the Pactolus valley in western Turkey, Young (W.J. 1972; cf. Whitmore and Young 1973) argued that this region has been an important source of Sumerian gold. Within a few years Ogden (1977), after a comprehensive review, concluded that direct correlation of a gold object and its metal source through the PGE inclusions was not feasible. Maxwell-Hyslop (1977) also questioned the Whitmore and Young

hypothesis, pointed to other more likely and closer sources for Sumerian gold, both in eastern Turkey and in Iran... The gross distinction seems to be that the Sumerians drew upon sources of gold other than those most easily accessible to western regions...

Silver... Silver is found in nature both as a metal and in its non-metallic state. It also occurs in practically all gold. Native silver is rare (20 per cent is abundant as gold; 0.2 per cent as abundant as native copper) and is usually found in quantities not worth melting to make larger, workable lumps (Patterson 1971)... The principal ores of silver are the sulphides (argentite: silver glance) and the chlorides (cerargyrite: horn silver), which yielded up their metal by simple smelting. It has long been generally assumed that most of the silver used in the Near East in antiquity was extracted from argentiferous lead ores, notably galena (lead sulphide) and cerussite (lead carbonate)...it appears, Aegean silver was largely produced from galena.

Two steps are involved in producing silver from lead ores. Lead ore is melted first under the appropriate reducing and/or oxidizing conditions to produce metallic lead. Silver is then extracted from the lead by cupellation by which the lead is oxidised to litharge (lead oxide), leaving behind the silver. For this the lead is heated under strongly oxidizing conditions in a cupel. The lead oxide so formed is absorbed in the porous material of bone or ground-up potsherds in the cupel, leaving silver metal behind. This process may be repeated several times to purify the silver; it is very efficient in freeing silver from such common impurities as copper, antimony, arsenic, tin, iron, zinc (less well for bismuth), in the argentiferous lead. Silver derived from argentiferous galena will be characterized by gold contents from zero to about 0.5 per cent, lead contents between 0.01 per cent and 1 per cent, or rarely a little higher (Gale and Stos-Gale 1981: 107).Silver derived from the native metal, with or without admixture of cerargyrite (a ‘dry silver’ ore very easily reduced to silver metal), will generally contain less than 0.01 per cent gold and significant quantities of mercury (ibid.). It is possible that silver was recovered sometimes from the cementation process through which electrum

was purified into gold. But there is, as yet, no hard evidence for this from literary, archaeological, or analytical sources, in the area and time range considered here.

It has recently been suggested that liquation, using lead metal to extract silver from copper, thought first to have been described by Agricola in the Ranaissance, had already been practised in the Late Bronze Age in installations excavated at Ras Ibn Hani in Syria (Bordreuil et al. 1984: 404-8, figs. 4-5). This identification is doubtful. The Old Babylonian texts from Mari cited in support of the existence of this process in the Near East in the second millennium BC do not sustain the case. They indicate that 'mountain copper' was 'washed' (?purified/refined) to produce 'washed copper' and that lead was used with silver to produce 'washed silver'; but they do not show that lead was added to copper to produce 'washed silver'; but they do not show that lead was added to copper to produce 'washed' silver, which is what would be expected if they are to be taken as evidence for the extraction of silver from coper by liquation (Bordreuil et al 1984: 407l citing Durand). That lead was plentiful in excavations at Ras Ibn Hani is not relevant to this question. What matters it the method of purifying, and there is no reason to suppose it was liquation either at Mari or at Ras Ibn Hani (cf. Muhly, J.D., 1988, The wider world of lead ingots, Report of the Department of Antiquities (Cyprus, Nicosia) 263-5).

River Sarasvati_, soma and electrum

One of the names for River Sarasvati_ is hiran.yavarn.a_. Sarasvati_ is among the 27 synonyms for a river (Hemachandra, Abhida_na cinta_man.i, 4, 145-146: nadi_, hiran.yavarn.a_, rodhovakara_, taran:gin.i_, saiva_livi, vaha_, hradini_, srotasvini_, nimnaga_, srota, nirjharin.i_, sarit, tat.ini_, ku_lan:kas.a_, va_hini_, kar.su_, dvi_pavati_, samudradayita_, dhuni, sravanti_, sarasvati_, parvataja_, a_paga_, jaladhiga_, ku_lya_, jamba_lini_.

Like the people of the Sarasvati-Sindhu civilization who were fire- and metal-workers, the people of the Rigvedic culture were fire-workers par excellence. Gold (hiran.yapin.d.a_n, hiran.yayuh) was highly valued (cf. RV. vi.47.23, vii.78.9).

Divoda_sa gave golden treasures to the r.s.i Garga. R.gveda refers to nis.kagri_va (RV. v.19.3) which is a golden ornament on the neck and necklaces of gold reaching down to the chest.hiran.ya (pl.) means gold ornaments (RV. 1.122.2). Gold was smelted from the ores (PB, xviii.6.4, JB I,10) which evoke the Indian alchemical tradition enshrined in the soma rasa, later elaborated as the science of alchemy: rasa-va_da. In Tamil soma-man.al means, sand containing silver ore. In Egyptian, assem means electrum; in Gypsy, somnakay means gold. Gold was won from the river-beds: Sindhu is called the hiran.mayi_ (RV. x.75.8**); Sarasvati_ is called hiran.yavartani_ (AV. vi.61.7).** [cf. the reference to vasati_vari waters in vedic hymns related to soma, an apparent reference to panned-gold from the Sarasvati_ river-bed.]

Soma

With this background information on the locus of Rigvedic culture and the Sarasvati-Sindhu civilization, we can revisit the archaeological evidence and the textual evidence.

The Soma yajn~a is the soul of the R.gveda (a_tma_ yajn~asya: RV. IX. 2,10; 6,8). Linking with Indra, Soma is called in RV. IX.85,3 the ‘soul (a_tma_) of Indra’, the bolt (vajra) of Indra’ (RV. IX.77,1) and even ‘generator of Indra’ (RV. IX.96.5).

What is Soma? Soma which was the ‘soul’ of the vedic sacrifice was put through three daily pressings, while worshipping all the gods. (Avesta Yasna X.2 mentions only two pressings). Soma/haoma literally means ‘extract’, from the root su – hu ‘to press’. Scores of decipherments have been claimed as summarized by Harry Falk (Soma I and II, 1989, BSOAS, LII, Pt. 1, pp. 77-90). It would appear that a new interpretation is possible: Soma was electrum (gold-silver ore) which was purified in the pavitram to yield potable gold and silver after reducing and oxidizing the baser metals using ks.a_ra supplied by plants and using bones also as reducing agents. (Kalyanaraman, Indian Alchemy: Soma in the Veda, Delhi, Munshiram Manoharlal, in press). This metallurgical, allegorical interpretation is

consistent with the decipherment of the script of the civilization revealed through over 3000 inscriptions on seals, tablets, copper tablets and on metallic weapons. The decipherment claims that the inscriptions are lists of bronze-brass-copper weapons produced by the fire- and metal-workers of the civilization. The dawn of bronze age in the civilization area is attested by many hundreds of artefacts of weapons and tools, apart from exquisite articles of jewellery using gold, silver, electrum, bronze, copper and artificial stones.

> d'm = electrum (Egyptian); assem= electrum (Egyptian); somnakay = gold (Gypsy); soma = electrum (RV)(See analysis in: Kalyanaraman, Indian Alchemy (in press).

In the early stages of the use of Soma, mythology was not the dominant characteristic; it was simply a product which had to be processed. (See also Falk, Harry, Soma I and II, 1989, *BSOAS*, LII, Pt. 1, pp. 77-90; Falk analyses Soma as a plant and concludes that it was ephedra, used as a stimulant). In the context of the poetics of the R.gveda which abounds in allegories, puns and metaphors, it is hypothesised that only Soma, and Soma alone was a product refined using Agni; all the other references to gods are poetic degrees of freedom to invoke gods into artefacts used in the processing of Soma. Perhaps, even Indra was relatable to the lexeme: indh (semant. firewood or charcoal):

i~dhaur.a_ = room for storing wood (H.); idho_n = tripod to put over the fire (Kal.); indhana = fuel (Pali); e~_date = fireplace (Wg.); saminddhe_ = sets fire to, takes fire; samiddha = ignited; samidh = fuel (RV.); samidha_ = fuel (Pali); samiha_ = fuel (Pkt.); su~dhkan.a_ = to be kindled (P.); negad.i = large fire lighted for warmth in cold weather or to keep off wild beasts (Te.); iruntai, iruntu, iruntil = charcoal (Ta.); cirun = charcoal (Pa.); sindi = soot (Kol.); sirin (pl. sirnil) = charcoal, cinders (Ga.); irk, sirik = charcoal (Go.); ri_ka, ri_nga = charcoal (Pe.); si_nga = charcoal (Kui); ri_nga, ri_ngla charcoal (Kuwi)

Gernot L. Windfuhr, [Haoma/Soma: the plant, in: Acta Iranica 25 (= Papers in Honour of Professor Mary Boyce, Hommages et Opera Minora, 11) (Leiden, 1985), 699-726, see pp. 703, 707] has pointed out that Soma was neither hallucinogenic nor intoxicant and proceeds to identify Soma as ginseng, a root used as a stimulant. The identification of Soma as a root is questionable because ginseng has no component to connote am.s'u/asu.

RV 10.34.1 states: Somasyeva maujavatasya bhaks.o vibhi_dako ja_gr.vir mahyam accha_n (an alerting eatable or food from mount mu_javat). Soma keeps Indra awake (vivyaktha mahina_ vr.s.an bhaks.am. Somasya ja_gr.ve (RV. 8.92.23). Soma is the inspirer or vipra of Angiras (RV. 9.107.6). [cf. an:ga_ra = glowing charcoal (RV.); angar id. (Gypsy). in:gha_l.a = growing embers (Pali); i~gal., i~gl.a_ charcoal-burner (M.); aggi = fire (Te.)] In the context of processing (refining or purifying or smelting) Soma (electrum ore or quartz), charcoal is a vital component; since charcaol combines with the baser metals and oxidizes them leaving the residual potable, gold-silver compound which is electrum. When Soma is referred to as indrapi_ta or 'drunk by Indra (indav indrapi_tasya)(PB 1.5.4), the reference is indeed to the reducing action of glowing charcoal embers during the process of smelting the electrum ore. Naturally, Indra received the major share of Soma. (RV. I.2,3; II.41 indicate the sequence of offerings of Soma: va_yu, indra-va_yu, mitra-varun.a, as'vins, indra, vis've deva_h, Sarasvati_.) Thus, Indra, as the chief partaker of Soma, is linked with Soma from the mountains (the ore) and some on the earth (ground in pressing-stones): 'May heavenly drink exhilarate theee, Indra, and also what is pressed in earthly places'. (RV. X. 116,3).

RV. X. 85,3 refers to the Soma known only to the brahmans; this is an early indication of the mystery or secret doctrine that would surround the Soma pressing process in later-day texts. The nature of Soma would be mystified in later texts by references to the moon (the colour of silver component of electrum). Tamil tradition has it in a lexeme: co_ma man.al = sand containing silver ore. (Winslow's lexicon).

The water element is the potable metal; Vr.tra withheld the waters. Indra frees the waters. Soma is described as having 'hanging branches bending down' (naica_s'a_kha: RV. III.53,14) It is not necessary to interpret the term 'ti_vra' (sharp) in the context of taste; ti_vra connotes the sharpness of the metallic components of the ore blocks. a~_su = fibrous layer at root of coconut branches, edge or prickles of leaves; a~_s = fibre, pith (Or.); a~_si~_ fine particles of flattened rice in winnowing fan (M.); these lexemes provide a semantic lead to the am.s'u/asu used to describe Soma; the term connotes the streaks of metal, seen like fibres of a stringy fruit or nap of cloth [a~_s (B.)]. The am.s'u was ruddy (RV. VII.98,1). The RV reference to Soma 'growing' on the mountains (giris.t.ha_) is explained in the context of the ores obtained from the mines in NW India. (giris.t.ha: RV. III.48,2; V.43.4; IX.18.1, 62,4; parvata_vr.dh: RV. IX.46.1) Hence, the reference to Somam adrau (RV. 5.85.2) plucked in two rocks. The colour of the Soma filaments contained in the ore block are 'reddish' or 'yellow' (arun.a/arus.a or hari/za_iri). Za_iri = golden-hued (Yasna IX.16,30). RV. 10.97.18, 19 refer to the group of herbs having Soma as their king (Somara_jn~ih); the growth of herbs on the mountains is the obvious reference here. 'Ma_taris'van fetched one of you (Agni and Soma) from heaven; the eagle twirled the other from the cloud-rock'. (RV. I.93,6).

Soma and the rocks

The links of Soma with rocks are vivid. (adri: RV. V.85,2; I.93,6)[See Bloomfield, The Legend of Soma and the Eagle, JAOS, 16, 1896, pp. 1-24). 'High is the birth of thee, the plant; thee being in heaven the earth received'. (RV. IX. 61.10). Yasna (X.4,10-12,17) places haoma on the high mountain haraiti; it is placed there by a skilful god, wherefrom holy birds carried it everywhere to the heights. R.gveda connects Soma with the mount Mu_javant: 'As draught of Maujavata Soma, so doth, the enlivening vibhi_daka delight me' (RV. X.34,1). Griswold notes: 'The mountain Mu_javantt (if it was a mountain and not simply the name of a people), being closely connected with the Gandha_ris (AV. V.22,5,7,8,14) must have been situated somewhere between Bactria and the Punjab. In the Tait. Samh. I. 8,6,2 and

the AV. Passages referred to above the Mu_javants are taken as a type of distant folk, to which Rudra with his fever-bearing bow is entreated to depart. In fact Mu_javant is as far off and mysterious as the river rasa_. Possibly both embody dim reminiscences of the undivided Indo-Iranian days." (p. 217). Soma flourished during the rainy season, swelling with milk (RV. II.13,1), strengthened by the rain-cloud, parjanya (RV. IX.82,3; 113,3). Yasna (X.3): 'I praise the cloud and the waters that made thy body to grow upon the mountains.' Later rituals state that Soma had to be purchased from a s'u_dra, who was a trader in Soma who was like the gandharva who held back the celestial Soma. (cf. ks.udraka = maker of minute beads or minor work in gold (Arthas'a_stra: 2.13.37 and 40). There is a reference to ki_kat.as in the context of the sacrifice: 'Amid ki_kat.as what do thy kine, O Indra? That tribe nor mixture (a_sir or milk for mixing with Soma) pours nor heats oblation; bear thou to us the wealth of pramaganda, give up, O Maghavan, to us the 'low-branched'. (RV. III.53,14). Regarding the ritual purchase of the Soma, TS. 6,1,6,7 states that one buys the Soma with a ruddy, yellow-eyed cow; 'this, one should know, is the form of Soma: then one buys it with its own deity. That became gold… Those who discourse on brahman say, 'how is it that offspring are produced through that which is boneless, and yet are born with bones?' Because one offers the gold, placing it in the ghee, therefore offspring are born… with bones."

In the tradition of the Black Yajurveda, A_pS'. 10,25,11 states that the adhvaryu should buy the Soma with gold saying: " I buy the bright (s'ukra, Soma) with bright (gold), the glittering (candra) with glittering, the amr.tam with amr.tam to match thy cow" (TS. 1,2,7,1); the Soma-dealer answers: "King Soma deserves more than that". Adhvaryu washes king Soma with water and unfolds him (A_pA'. 11,1,11). "Every shoot of thee, O Soma, must swell for Indra…" (TS. 1,2,11,1). The purpose of the yajn~a is: ' by means of ghee as the vajra and two sacrificial ladles as their arms the gods slew Vr.tra. Vr.tra is the Soma. One should know that they slay Soma, when they sacrifice with ghee in his presence. By means of these mantras one makes Soma swell again." (TS. 6,2,2,4)

The Avestan references to Haoma as a plant can be explained as a ritualistic representation of the Soma refining process of the earlier days on the banks of the Sarasvati river. Yasna refers to the scent of the plant (Yasna, 10,4) but RV does not. There is, however, reference to the intense smell of the type common in the workshop of a metalsmith who uses ks.a_ra (plant-based alkalis) to oxidise the impurities or baser metals in an ore block. Griswold notes that there are only two references to haoma in the Ga_tha_s of Zoroaster, one mentioning du_raos'a ' the averter of death' (Yasna, XXXII.14), the standing epithet of haoma in the later Avesta, and the other alluding to 'the filthiness f this intoxicant'(Yasna, XLVIII.10).These allusions are sufficient to prove that the intoxicating haoma was under the ban of the great reformer (H.D. Griswold, 1923, The Religion of the R.gveda, London, Oxford University Press, p. 14)

Next in importance to Agni and Indra, Soma is addressed in about 120 hymns of the R.gveda. Indra and Varun.a gain anthropomorphic status as gods; but Soma is generally represented in its physical nature.

Soma pavama_na. Soma in the process of passing through the refining instrument (potr.). [The actors are: Hotr., connected with Indra; the Potr. connected with the Maruts (Potr. is the purifying priest; also the 'cleaning' insrument); the Nes.t.r. linked with Tvas.t.r.; the divine wives, agni_dh with agni, the brahman with Indra and the pras'a_s.t.r. with mitra-varun.a]. ulu_khala (mortar) is used to press Soma (RV. I.28,1,5; gra_van is rendered as a 'press-stone'). This is a reference to the pounding of the ore block to pulverize the ore. In Yasna (XXIV.7; XXV.2) ha_vana (hu = to crush) is 'the utensil in which the twigs of the haoma plant are pounded'. Another method refers to the gra_va_n.ah (press-stones) are placed on the'ox-hide', held by the hands and with ten fingers and activated through two boards. (RV. X.76,94 and 175). Dhis.an.a_ (RV. X.17,12) is perhaps a reference to a hollow in which the press-stones work. This may be a reference to a hollow covered with ox-hide specially prepared on the sacrificial ground. The ox-hide is refered to in RV. IX.79,4; IX.66,29; IX.101,11 and was used to catch the drops of Soma (apparently, the pulverized bits of the electrum ore block). The later rituals

state that the pressing-boards are adhis.avan.a phalaka and are also laid across a sounding-hole dug beneath (See Hillebrandt, VM. I.148). A reference to the sacrificial ground with the hollow is mirrored in the term: r.tasya yoni (RV. IX.64,11,22): the home of the yajn~a. The reference to r.tasya dha_ra_ (RV. IX. 63,14,21) is a reference to the process of flowing through the wool strainer.

Indra's outward appearance flowed away from his semen and became suvarn.am hiran.yam when he had drunk Soma that was exposed to witching. (S'Br 13,1,1,4: S'Br. 12,7,1,1: retasa eva_sya ru_pam asravat; tat suvarnam hiran.yam abhavat; cf. J.Gonda, 1991, The Functions and Significance of Gold in the Veda, Leiden, E.J.Brill, p. 5). [Note: S'Br. 12,7,2,10: lead (s'i_sa) is 'a form of both bronze and gold'; ahi is a snake; na_ga is a snake; na_ga = lead (Skt.)] RV. 4,17,11 relates how Indra gained cows, gold, troops of horses. When Soma purifies itself, Soma wins cattle, chariots, gold, the light of heaven, and water for them (RV. 9,78,4). The river Sindhu is rich in excellent horses, good chariots, good garments, rich in gold (RV. 10,7,5,8). RV. 9,112,2 recounts how the blacksmith searches for a customer who possesses (much) gold. Gold is described as s'ukram hiran.yam (RV. 8,65,11) or shining with a light of its own. "He who buys the (Soma) with gold buys it as sas'ukram" (Taittiri_ya Sam.hita_: 6,1,10,1). Even the sun is equated to gold: hiran.yam prati su_ryah (RV. 1,46,10: sun is equivalent to gold). Agni is called hiran.yaru_pa (RV. 4,3,1: gold-like). Apa_m Napa_t (the Child, Descendant of the Waters) has a terrestrial form of the earthly fire and is associated with gold (RV. 2,35,10: hiran.yaru_pah; RV. 2.35,9: hiran.yavarn.a_h). Indra and Va_yu's chariot (which is 'heaven-touching') is made of gold (RV. 4,46,4). RV. 2,35,10 reports that Apa_m napa_t in his earthly manifestation as the sacrificial fire, comes out of the golden yoni (yoni hiran.yaya which is Soma's seat (RV. 9,64,20).

References to electrum may be noticed in RV. 8,45,22 where the metal silver is called 'whitish hiran.ya'; rajata is used as an adjective to mean 'whitish, silver-coloured'. [See A_pS. 5,29,2 which states that rajatam hiran.yam should not be given as a daks.in.a_.]

Pu_s.an has golden ships which sail in the sea (RV. 6,58,3) and bears an axe made of gold (RV. 1,42,6).

RV. 9,86,43 refers to Soma as hiran.yapa_va_h which can be interpreted as ‘purified golden Soma.’

Soma was poured through through a sieve made of wool. Every hymn of Book IX of the R.gveda refers to the filtering through the strainer. (pavitra = sieve, means of purifying, filter; pu_ = to purify; pavate = he cleanses himself; pavama_na = self-purifying). References to filtering are in : RV. IX.1, 1 and 6; IX.28, 1,2,6. ‘Soma while filtering himself, flows thousand-streamed, across the wool’ (RV. IX.13,1). In this filtering process, Soma is tawny in colour; and sounds like the thunder of the sky or the bellowing cattle. In RV. IX.97,33 the word ‘karman’ is used to denote the toil involved in the sacrifice.

Soma is mixed with milk (gava_s’ir = addition of milk to Soma), curd and grain. These are intended to stoke the burning embers and to act as oxidizing agents to remove the baser metals.

The rasa of the Soma is emphasized (RV. 8,3,20; 9,67,8; 15; 9,76,1 describes the rasa as kr.tvya or efficacious, as daks.a or ability. Somya rasa (RV. 9,67,8) is the ‘sap, which constitutes the essence, best, beneficial element of Soma’. The colour of the rasa is hari (yellow, tawny)(RV. 9,19,3; 9,25,1; 9,103,4; 9,78,2; 10,96,6 and 7. RV. 8,29,1 refers to Soma as babhru (reddish-brown) and a youth who is applying a golden ointment (an~ji… hiran.yayam) to himself. RV. 9,107,4 refers to Soma as utsah hiran.yayah: a spring of gold [Geldner, Rig-Veda ubers, K.F. Geldner, Der Rig-Veda ubersetzt, Cambridge, Mass., 1951, III, p. 110). RV. 9,86,43: sindhor ucchva_se patayantam uks.an.am hiran.yapa_va_h pas’um a_su gr.bhn.ate: "purifiers of gold seize in them (i.e. the vasati_vari_ water left standing overnight) the animal (pas’u_), i.e. the bull (Soma) that flies in the upheaving of the river." Thus in this hymn, the gold which is purified referes to the juice of Soma which is golden.

RV. 6,61,7 refers to Sarasvati_ as hiran.yavartani or one endowed with a golden course. RV. 9,8,39; 38 implore Soma to clarify itself while procuring gold.
RV. 9,75,3: ava dyuta_nah kalas'am acikradan nr.bhir yema_nah kos'a a_ hiran.yaye = Soma rushed down in the jars with loud cries, held (in hands) by the men in the golden vessel (kos'e).

Soma is pita_ deva_na_m (RV. IX.109,4) or father of the gods.
Hiran.yagarbha, the golden germ was evolved in the beginning (RV. 10,121,1`). Hiran.yagarbha is the title of Praja_pati, who is declared as the only god who encompasses all the created things (ja_tah patir). "(he) who by his might has ever been (babhu_va) the sole lord of the world that breathes and blinks, who rules over these two-footed and four-footed (beings), to what god shall we pay homage with oblation?" (RV. 10,121,3). This reference is considered by some to be a later addition. (for e.g., cf. Edgerton, F., The Beginnings of Indian Philosophy, London, 1965). The Being who evolved in the beginning is also the lord of the snow-clad mountains, the ocean and the river Rasa_. He is the fashioner who tied heaven and heaven. When the waters moved producing Agni, from the waters evolved the asu (life-principle?) of the gods. [Note the use of am.s'u as an epithet of Soma.] Hiran.yagarbha is the only god over the gods: yo_ deves.v adhi deva eka asi_t.

नि त्वा दधे वर आ पृथिव्या इळायास् पदे सुदिनत्वे अह्नाम् ।
दृषद्वत्याम् मानुष आपयायां सरस्वत्यां रेवद् अग्ने दिदीहि ॥

RV 3.023.04 I place you in an excellent spot of earth on an auspicious day of days; do you, Agni, shine on the frequent (banks) of the Dr.s.advati, A_paya_ and Sarasvati_ rivers. [In an excellent spot of earth: pr.thivya_ il.a_yaspade, in the footmark of the earth in the form of a cow; i.e. on the northern altar; frequented banks: ma_nus.e, relating to man or to Manu; implies, manus.yasam.caran.avis.aye

ti_re, on a bank, a place frequented by men; the Dr.s.advati_ and Sarasvati_ rivers are well known (r.s.ayo vai sarasvatya_m satrama_sata, the seers performed a sacrificial season on the Sarasvati_; they drove away Kavas.a Ailu_s.a from the soma : Aitareya Bra_hman.a 2.19)].

The account in Aitareya Bra_hman.a: Sections 3.2.19 and 20 deal with the recitation for the drawing of the water for the soma. "The seers performed a sacrificial season on the Sarasvati_; they drove away Kavas.a Ailu_s.a from the soma, 'The child of a slave woman, a cheat, no Brahman; how has he been consecrated in our midst?' They sent him out to the desert, (saying), 'There let thirst slay him; let him drink not the water of the Sarasvati_'. He sent away to the wilderness, afflicted by thirst, saw the 'child of the waters' hymn (RV 10.30), 'Forth went to the dear abode of the waters; him the waters welled out after; all around him Sarasvati_ hastened. Therefore they call it here Parisa_raka, in that Sarasvati_ went all around him. The seers said, 'The gods know him; let us summon him'. 'Be it so' (they replied). They summoned him; having summoned him they performed this 'child of the waters' (hymn), 'Forth among the gods let there be speeding for the Brahman'; therewith they went to the dear home of the waters, of the gods. He goes to the dear home of the waters, of the gods; he conquers the highest world who knows thus, and he who knowing thus performs the 'child of the waters' (hymn). It he should recite continuously; Parjanya comes to rain continuously for offspring when one knowing thus recites this continuously. If he were to recite with divisions, then Parjanya would rain with clouds for offspring; therefore should it be recited continuously only. Of it he recites the first (verse) thrice continuously; verily thereby the whole is continuously recited….'Send forth our sacrifice with divine offering' (he says) as tenth (RV 10.30.11). 'Winding hitherward those of two streams' (he says (RV 10.30.10)…'What time the waters are seen coming forward' (he says (RV 5.43.1) when they are being seen; 'may the cows with milk, eager for the end' (he says: RV 2.35.3), when they are coming up; 'some come together, others come up' (he says: RV 1.83.2) when they come together. The waters were in conflict…both these Vasati_vari_ waters, which are drawn on the previous day and the Ekadhana_

(waters which are drawn) in the morning. These Bhr.gu saw, ‘These waters are in conflict’. Them with this verse he brought into harmony, ‘Some come together, others came up.’..’Like the waters divine they come up to the vessel of the offering’ he recites (RV 5.43.1) when they are being poured together into the Hotr.’s goblet, both the Vasati_vari_ and the Ekadhana_ (waters)…” (Aitareya Bra_hman.a, 3.2.19-20).

Aitareya Bra_hman.a verses 10.12.1-3 continue the soma sacrifice (the aponaptri_ya) with the statement: The waters are the sacrifice; in that they come to the waters, verily they come to the sacrifice. Moreover the waters are strength and sap…Moreover the waters are immortality…’The waters’ is the first form of the thunderbolt; ‘Sarasvati_’ is the second form of the thunderbolt (RV 10.30.12); this is a hymn of 15 verses (RV 10.30), that is the third form of the thunderbolt. The gods with the thrice-forged thunderbolt pushed away the asuras from these worlds…The Ma_dhyamas (the ma_dhyama r.s.is are listed in A_s’vala_yana Gr.S. 3.4) performed a sesson on the Sarasvati_. Then Kavas.a sat down in the midst, they said to him,’Thou art the son of a female slave; we will not eat with you’. He rushing on in anger praised the Sarasvati_ with this hymn; she followed after him; thereupon they felt themselves free from passion; they went after him and said ‘O seer, homage be to thee; harm us not; thou art of us the best, seeing that she follows after three.’ Thus they informed him; they removed his anger. This is the greatness of Kavas.a and the founder of the hymn (is he). In that they go with their wives (it is because)_ the Gandharvas as commissioners (praya_hita_h) in the waters guard the Soma of Indra…He recites twenty (verses); they make up the Vira_j; the waters are connected with the Vira_j, the Vira_j is food, the waters are food… So much for the Aponaptri_ya.

Anuva_ka III; r.s.i: kavas.a ailu_s.a; devata_: a_po devata_ or apa_mnapa_t; chanda: tris.t.up

प्र देवत्रा ब्रह्मणे गातुर् एत्व् अपो अच्छा मनसो न प्रयुक्ति ।
महीम् मित्रस्य वरुणस्य धासिम् पृथुज्रयसे रीरधा सुवृक्तिम्
अध्वर्यवो हविष्मन्तो हि भूताच्छाप इतोशतीर् उशन्तः ।
अव याश् चष्टे अरुणः सुपर्णस् तम् आस्यध्वम् ऊर्मिम् अद्या सुहस्ताः ॥
अध्वर्यवो ऽप इता समुद्रम् अपां नपातं हविषा यजध्वम् ।
स वो ददद् ऊर्मिम् अद्या सुपूतं तस्मै सोमम् मधुमन्तं सुनोत ॥
यो अनिध्मो दीदयद् अप्स्व् अन्तर् यं विप्रास ईळते अध्वरेषु ।
अपां नपान् मधुमतीर् अपो दा याभिर् इन्द्रो वावृधे वीर्याय ॥
याभिः सोमो मोदते हर्षते च कल्याणीभिर् युवतिभिर् न मर्यः ।
ता अध्वर्यो अपो अच्छा परेहि यद् आसिञ्चा ओषधीभिःपुनीतात् ॥
एवेद् यूने युवतयो नमन्त यद् ईम् उशन्न् उशतीर् एत्य् अच्छ ।
सं जानते मनसा सं चिकित्रे ऽध्वर्यवो धिषणापश् च देवीः ॥
यो वो वृताभ्यो अकृणोद् उलोकं यो वो मह्या अभिशस्तेरमुञ्चत् ।
तस्मा इन्द्राय मधुमन्तम् ऊर्मिं देवमादनम् प्र हिणोतनापः ॥

प्रास्मै हिनोत मधुमन्तम् ऊर्मिं गर्भो यो वः सिन्धवो मध्व उत्सः ।
घृतपृष्ठम् ईड्यम् अध्वरेष्व् आपो रेवतीः शृणुता हवम् मे ॥
तं सिन्धवो मत्सरम् इन्द्रपानम् ऊर्मिम् प्र हेत य उभे इयर्ति ।
मदच्युतम् औशानं नभोजाम् परि त्रितन्तुं विचरन्तम् उत्सम् ॥
आववृर्ईततीर् अध नु द्विधारा गोषुयुधो न नियवं चरन्तीः ।
ऋषे जनित्रीर् भुवनस्य पत्नीर् अपो वन्दस्व सवृधः सयोनीः ॥
हिनोता नो अध्वरं देवयज्या हिनोत ब्रह्म सनये धनानाम् ।
ऋतस्य योगे वि ष्यध्वम् ऊधः श्रुष्टीवरीर् भूतनास्मभ्यम् आपः ॥
आपो रेवतीः क्षयथा हि वस्वः क्रतुं च भद्रम् बिभृथामृतं च ।
रायश् च स्थ स्वपत्यस्य पत्नीः सरस्वती तद् गृणते वयो धात् ॥
प्रति यद् आपो अदृश्रम् आयतीर् घृतम् पयांसि बिभ्रतीर् मधूनि ।
अध्वर्युभिर् मनसा सृलतविदाना इन्द्राय सोमं सुषुतम् भरन्तीः ॥
एमा अग्मन् रेवतीर् जीवधन्या अध्वर्यवः सादयता सखायः ।
नि बर्हिषि धत्तन सोम्यासो ऽपां नप्त्रा सृलतविदानास एनाः ॥
आग्मन्न् आप उशतीर् बर्हिर् एदं न्य् अध्वरे असदन् देवयन्तीः ।

अध्वर्यवः सुनुतेन्द्राय सोमम् अभूद् उ वः सुशका देवयज्या ॥

10.030.01 (Honoured) by adoration, let the advancing Soma approach the celestial waters like the celerity of the mind; offer abundant (sacrificial) food, and perfect praise for the sake of Mitra and Varun.a, and for (Indra) the rapid mover.

10.030.02 Priests, since you are charged with the libation, desiring (to present it), proceed to the waters desiring (to receive it), to those (waters) which the red hawk beholds descending (from the clouds); do you, dextrous-handed (priests), cast today that flood (of Soma) into (the consecrated water). [Red hawk: suparn.a = supatanah somah, the Soma descending gracefully (ava) from the firmament, and suhasta = ornamented with golden filter etc., because they are engaged in the graceful work of expressing the Soma etc.]

10.030.03 Go, priests, to the water, to the reservoir; worship the grandson of the waters with oblations; may he today give you the consecrated water, and do you pour forth to him the sweet-flavoured Soma. [The grandson of the waters: apa_m napa_tam = deity appointed to produce the rain].

10.030.04 (He) who shines, without fuel, in the midst of the waters, he whom the pious worship at sacrifices, grandson of the waters, give us those sweet waters by which (mixed with the Soma), Indra is elevated to heroism. [Soma personified, as the grandson of the waters is related to Soma which is to be mixed with the water of the Vasati_vari_].

10.030.05 Those waters with which Soma sports and delights as a man (sports) with elegant young damsels; do you, priest, approach to obtain them; when you sprinkle them (in libation), purify (them with the filter) along with the plants.

10.030.06 Verily as young damsels welcome a youth when desiring (them), he comes to them desiring (him), so the priests and their praise and the divine waters agree in mind and contemplate (their mutual assistance). [The youth and nymphs are the Soma and the Vasati_vari_ waters; nothing more is meant than their mixture].

10.030.07 Present, waters, the sweet-flavoured god-exhilarating mixture to that Indra who has made an issue for you when enveloped (by the clouds); who has liberated you from a great calamity.
10.030.08 Send forth, rivers, the sweet-flavoured beverage to him who is your germ, a well of the sweet (Soma), the Soma which is mixed with butter adorable at sacrifices; hear, opulent waters my invocation. 10.030.09 Send, rivers, (to our sacrifice), that exhilarating wave the Soma of Indra, which sends us both (kinds of fruit), exciting exhilaration, desirous (of mixing with the Soma). Generated in the firmament, spreading through the three (worlds), flowing (amidst the vessels of sacrifices), a well (of satisfaction to the gods). [Both kinds of fruit: the fruit, whether reward or punishment, of the present life (dr.s.t.a), and of a former life (adrs.t.a)].
10.030.10 Praise, r.s.i, the waters like (those) of the cloud-warring Indra, falling in many showers, returning, flowing to mix (with the Soma), the mothers of the world and its protectresses, augmenting and combining (with the Soma).
10.030.11 Direct our sacrifice to the worship of the gods; direct our adoration to the acquisition of wealth; open the udder on the occasion of (this) rite; be to us, waters, the givers of felicity. [The udder: u_dhas is the skin in which the Soma is contained (adhis.avanacarma); yoga = the cart on which Soma is placed; opoen the skin which is on (or below) the sacrificial cart (Nirukta 6.22: u_dhasodhasta_davasthiteneti manyama_no niruktaka_ro bravi_ti-- ya_jn~e s'akat.a iti va_)].
10.030.12 Opulent waters, you rule over riches; you support good fortune, pious rites, and immortality; you are the protectresses of wealth and of offspring; may Sarasvati_ bestow all this opulence on him who praises you.
10.030.13 I behold you, waters, coming to (the sacrifice), conveying the butter, the water, the sweet (Soma); conversing mentally with the priests, and bringing the well-effused Soma for Indra.
10.030.14 These opulent and life-sustaining (waters) have come (to my sacrifice); friendly priests, make them sit down; place them on the sacred grass, you offerers of the Soma, conversing with the grandson of the waters.

10.030.15 The waters desiring (it) have come to this sacred grass, and wishing to satisfy the gods, have sat down at our sacrifice; express priests, the Soma for Indrra; for you the worship of the gods is easy.

Devi_ Bha_gavata, Navama Skandha recounts the curse of Sarasvati_: Laks.mi_, Sarasvati_ and Gan:ga_ were in Vaikun.t.ha with Mah_vis.n.u. Gan:ga_ infuriated Sarasvati_ by casting lustful glances on Vis.n.u. When Laks.mi_ intervened to pacify the quarrelling ladies, Sarasvati_ cursed that Laks.mi_ be born on earth. Gan:ga_ could not countenance this curse on Laks.mi_ and in turn cursed that Sarasvati_ be born as a river on earth. Sarasvati_ retaliated by cursing that Gan:ga_ also be born as a river on earth to take upon herself the sins of all the people in the world. Vis.n.u arbitrated: "Let Laks.mi_ be born to Dharmadhvaja to purify the three worlds and to be reborn as the plant tulasi_, to marry an asura called S'an:khacu_d.a who will be born of Vis.n.u. Thereafter, Gan:ga_ will become a river called Padma_vati_ and return to Vaikun.t.ha. Let Gan:ga_ go to earth as a holy river to be led by a king called Bhagi_ratha, to marry King S'antanu. Gan:ga_'s divine form will return to Mt. Kailasa as the consort of S'iva. Let Sarasvati_ also be born as a river on earth and ultimately return to Satyaloka to become the consort of Brahma_."

पावीरवी कन्या चित्रायुः सरस्वती वीरपत्नी धियं धात् ।
ग्नाभिर् अच्छिद्रं शरणं सजोषा दुराधर्षं गृणते शर्म यंसत् ॥

6.049.07 May the purifying, amiable, graceful Sarasvati_, the bride of the hero, favour our pious rite; may she, together with the wives of the gods, well pleased, bestow upon him who praises her a habitation free from defects and impenetrable (to wind and rain), and (grant him) felicity.

त्री षधस्था सिन्धवस् त्रिः कवीनाम् उत त्रिमाता विदथेषु सम्राट् ।

ऋ॒तावं॑री॒र् योषं॑णास् ति॒स्रो अप्या॒स् त्रिर् आ दि॒वो वि॒दथे॑ पत्यं॑मानाः ॥

3.056.05 Rivers, the dwelling-places of the intelligent gods are thrice three; the measurer of the three (worlds) is the sovereign at sacrifices; three female (divinities) of the waters charged with the rains descend from heaven at the thrice (repeated) solemnity. [Each of the three lokas has three divisions; this information is addressed to the river, Sindhavah being in the vocative case; the measurer of the three worlds: the sun or the year; three female divinities: il.a_, sarasvati_ and bha_rati_].

Based on this classification, many goddesses are named in the R.gveda: I Of the earth: agna_yi_ (7.8; 9.33); pr.thivi_ (7.8;9.31); il.a_ (7.8; 8.13; also as tisro devi_h); us.a_sa_nakta_ (dawn and night as dual deity 8.10); tisro devi_h (il.a_, bha_rati_, sarasvati_ 8.12-3); nadyah (rivers: 9.25); a_pah (waters: 9.26); os.adhayah (herbs: 9.27); ra_tri (nighyt: 9.28); aran.ya_ni_ (9.29); s'raddha_ (9.30); apva_ (9.32); II Of the atmosphere: aditi (11.23); sarama_ (11.24); sarasvati_ (25-26); va_k (11.27); anumati (11.29); ra_ka_ (11.30); sini_va_li_ (11.31); kuhu_ (11.32); yami_ (11.33-4); urvas'i_ (11.35); pr.thivi_ (11.36); indra_n.i_ (11.37-38); gauri_ (11.39-40); gauh (11.41); dhenu (11.42); aghnya_ (11.43); pathya_ svasti (11.44); us.a_ (11.46); il.a_ (11.48); rodasi_ (11.49-50); III Of the sky (celestial): us.a_ (12.5-6); su_rya_ (12.7); vr.s.a_kappa_yi_ (12.8); saran.yu_ (12.9); pa_vi_ravi_ va_k (12.30); pr.thivi_ (12.30); devapatnyah (12.44-46: indra_n.i_, agna_yi_, as'vini_, ra_t.. (ra_j), rodasi_, varun.a_ni_).

Amba_, ambika_ as mother is connected with: a_pah (RV 1.23.16), sarasvati_ (RV 2.41.16), indra_n.i_ (RV 10.86.7). Sarasvati_ is amba_, indeed, ambitama_ (best of mothers: RV 2.41.16). A_pah are our mothers (ambayah: RV 1.23.20), the eternal mothers (s'vati_s.u ma_tr.s.u: RV 4.7.6); waters are the mothers (a_pah asma_n ma_tarah: RV 10.17.10; ma_tri_h a_pah: RV 3.9.2). Va_k is born in the waters (mama yonir apsva: RV 10.125.7). Apa_m Napa_t is described as born of rivers (na_dya: RV 2.35.1).

The creation of the universe is explained in the context of the Mighty waters (a_po br.hati_h: RV 10.121.7) which contained the germ which created the universe and produced the productive Agni. Jaimini_ya Upanis.ad Bra_hman.a notes that Va_k is transcendental and is the great, mystic principle of creation and universal existence. (Jaim. Up. Br. 1.28.1-10). Va_k is suparn.i_ ma_ya_. (S'B 3.6.2.2; cf. suparn.a garutma_n, the well-winged eagle associated with the asura sun: RV 1.163.6; savita_: RV 10.149.3). The term, 'suparn.a' seems to be releated a variegated stone in RV 5.047.3-4) and may explain the nature of creation that is sought to be linked with Va_k:

उ॒क्षा स॑मु॒द्रो अ॑रु॒षः सु॑प॒र्णः पूर्व॑स्य॒ योनि॑म् पि॒तुर् आ वि॑वेश ।

मध्ये॑ दि॒वो निहि॑तः॒ पृश्नि॒र् अश्मा॒ वि च॑क्रमे॒ रज॑सस् पा॒त्य् अन्तौ॑ ॥

च॒त्वार॑ ईम् बिभ्रति क्षेम॒यन्तो॒ दश॒ गर्भं॑ च॒रसे॑ धापयन्ते ।

त्रि॒धात॑वः प॒रमा अ॑स्य॒ गावो॑ दि॒वश् च॑रन्ति॒ परि॑ स॒द्यो अन्ता॑न् ॥

5.047.03 The showerer (of rain), the shedder of dew, the radiant and quick-going (car) has entered the region of the paternal east; the many-tinted and pervading (luminary) proceeds to both extremities of the firmament, (and so) preserves (the world). [Many-tinted and pervading luminary: pr.s.n.ir as'ma_ vicakrame rajaspatyantau: as'ma = vya_paka or sarvatra vya_pta, pervading; also, it means, a stone, an allusion to a pa_s.a_n.a, or stone, which in some ceremonies is placed in the a_havani_ya fire; as'ma may also imply a simile, the term of comparison being dropped, luptopama_ va_ as'ma_ sa_dr.s'ah].

The bull, the ocean, the ruddy suparn.a went into the womb of the primeval father. He comes out set as variegated stone in the middle of the heaven. He watches over the two limits of space. (Geldner).

5.047.04 The four (chief priests) sustain him (with oblation and praises), seeking their own welfare; the ten (regions of space) invigorate him, their

embryo, to travel (his daily course); his three elementary rays swiftly traverse the boundaries of the sky. [The four chief priests: the text has only catva_rah, four; r.tvijah are implied; his three elementary rays: tridha_tavo ga_vah, supposed to be the causes of cold, heat and rain. Or, simply three ore elements: copper, silver, gold].

R.gveda: Soma and Maha_vrata

Rigvedic culture was governed by a cooperating society among the yajn~ikas and others, both endeavouring to generate wealth:

> **sama_ne u_rve adhi sangata_sah sam ja_nate na yatante mitha-s-te te deva_na_m na minanti vrata_nyamardhanto vasubhir-ya_dama_na_h** (RV. 7.76.5)

Being united with common people they become of one mind; they strive together as it were, nor do they injure the rituals of the gods, non-injuring each other they move with wealth. (Sa_yan.a explains sama_ne u_rve as cattle --common property of all: sarves.a_m sa_dha_ran.e go-samu_he).

Many R.gvedic workers were also fire-/metal-workers like the armourers who produced weapons using copper and tin/zinc alloys yielding bronze and brass.

The fire-workers also produced lapidary crafts such as stoneware bangles and gem-stones, apart from the use of electrum and bronze for ornaments. The evidence of inscriptions has yielded two silver seals apart from scores of copper tablets used to convey movable property transactions.

The Sarasvati-Sindhu rivers supported the cultivation of wheat and barley, as evidenced by the archaeological finds. (John Marshall, *Mohenjo-daro and the Indus Civilization*, vol. 1, p.27) s’unam nah pha_la vi kr.santu bhu_Umim...

suns_s’i_ra_ s’unam-asma_su dhattam: the ploughshare ploughing makes the food that feeds us and with the feet cuts through the path it follows (RV. iv.57.5-7).

Many vedic people were herdsmen, pastoralists: ja_to-yad-agne bhuvana_ vyakhyah pas.un na gopa_: agni looks upon the people of the world as a herdsman watches his cattle. (RV. x.19.3-5).

The vedic period was a nascent material culture: the period had weavers; the words siri_ and vayitri_ denote a female weaver. (RV. x.71.9; PB, I.8.9); tasara is reffered to which is a shuttle (RV. xiv.2.51). Reference to women workers engaged in weaving is provided: tantum tatam samvayanti (RV. ii.3.6).

Maha_vrata

Maha_vrata is the last day but one of the Gava_mayana Sattra which represented the whole year. The middle day was the vis.uvat or summer solstice and the last day but one was the Maha_vrata or the winter solstice. The rites are related to the increase of ths sun’s heat after the solstice. [gava_ can be interpreted as ‘earth’ and hence, gava_mayana connotes the reference to the wintersolstice which records the apparent shift in the motion of the sun.]

Some typical activities on this ancient festival day were: warriors fully armed would pierce with arrows the stretched skin of a barren cow. On a rough hide, an a_rya and a s’u_dra wrestle. The Ma_rjali_ya fire is lit and maidens carrying jugs of water on their heads encircle the fire. Maithuna is an attempt to produce fertility as a form sympathetic magic. Music by drumming is played accompanied by obscene language to drive away the demons.

Maha_vrata (as a remarkable example of the continuity of the civilization and culture on the banks of the Sarasvati). Maha_vrata is the day of the winter solstice which is celebrated as the New Year’s Day in Punjab, Assam and Tamil Nadu (cf. Festivals of Rohri, Bogali Bihu, Bhogi-Pongal; the tradition is to burn out the old

and herald the new by using the fresh produce from the harvest.) Aitareya a_ran.yaka is an integral component of the R.gveda. The a_ran.yaka has three books: (1) the first book explains the maha_vrata as a ritual and as an allegory and described the ‘sastras of the morning, midday and evening libations of the maha_vrata day of the gava_mayana; (2) the second book explains the allegory of the uktha, which is the nis.kevalya s’astra (midday s’astra as the pra_n.a or purus.a); the second book also has the superb upanis.ad (adhy_ayas 4-6); (3) the third book discusses the mystic meaning of the various forms of the text of the sam.hita_, the nirbhuja, pratr.n.n.a and ubhayamantaren.a, and of the vowels, semivowels and consonants. These terms are used to described the sam.hita_, pada and krama pa_t.has of the sam.hita_. The fourth book has maha_na_mni_ verses to be studied in the forest. The fifth book has the nis.kevalya s’astra of the midday libation of the maha_vrata. The fifth book is attributed to S’aunaka (ca. 500 B.C.) who is anterior to Pa_n.ini by about 100 years. (A.B.Keith, 1909, Aitareya A_ran.yaka, Oxford, Clarendon Press).

"Now begins the Maha_vrata rite. Indra having slain Vr.tra became great. When he became great, then there came into being the Maha_vrata." (Sa_yan.a explains the term mah_vrata: maha_n bhavaty anena vratena or mahato devasya vratam or mahac ca tad vratam. (Aitareya A_ran.yaka I.1)

"In the Maha_vrata ceremony there are twenty-five verses to accompany the kindling of the fire (Aitareya A_ran.yaka: V.1)

Maha_vrata is an agnis.t.oma and has the morning, midday and evening pressings of the Soma.. The fire-altar is in the shape of a bird. The activity of the Hotr. in the Maha_vrata rite is recorded only in the Aitareya A_ran.yaka and the S’a_n:kha_yana A_ran.yaka. The activity is shrouded in total secrecy. "The Adhvaryu brings up the vessel containing the libation and the (three) atigra_hya bowls. As soon as he perceives the food, the Hotr. Descends from the swing towards the east. Then they tie up the swin to the west that it may not slay the reciter when about to eat. For the Hotr. eats seated on the place of the swing. Then

the Hotr. consumes the (libation in the) vessel with the words uttered in response, ‘May speech, the deity, rejoice in the Soma,’ ‘May Soma, the king, shower life on me for my breath,’ ‘May my breath milk mightily all life… At the proper time they should carry the swing to the bath, and burn together the seats.’ " (Aitareya A_ran.yaka : V.3,2) As it is completed, the vedi and the br.si_s are both consumed by fire.
Electrum, gold, silver: Soma in the R.gveda

Soma is meant for the gods, not a drink for the mortals; thus, gods in the R.gveda are an allegorical personification of the purification processes (of Soma), just as Soma is an a_pri deity, together with other materials and apparatus (ladles and vessels) employed in the yajn~a, accompanied by r.cas (or, agnis.t.oma).

somam manyate papiva_n yatsampim.santyos.adhim
somam yam brahma_n.o vidurnatasyas’na_ti kas’cana (RV. 10.85.3)

“One thinks one has drunk soma after crushing the os.adhi (herbs); soma which bra_hman.as know is never drunk.”

(The same hymn as RV. 10.85.3 in AV XIV.1.3).

‘O Soma, guarded by that which is meant to cover you, guarded by him who lives in the high (heaven?), you stand listening to the pressing stones. No earthly one eats you.’ (RV X.85.4).

Cha_ndogya Upanis.ad (V.10.4) is emphatic: es.a somo ra_ja_ tad deva_na_m annam tam deva_ bhaks.yanti ***Soma*** is king. ***Soma*** is food for the gods. Gods eat ***Soma.***

According to Louis Renou, the immense Rigvedic collection is present in nuce in the themes related to ***Soma***. About 120 hymns out of a total of 1028 hymns or a thousand verses and almost the entire ninth book deal with ***Soma***. ***Soma*** is a

material and also the only process elaborated in the *R.gveda*. The rest of the hymns related to Agni, Indra or other facets of vedic life will have to be concordant with this process which seems to constitute the very essence of vedic life, a process integral to the day-to-day living of the vedic seeker. The ams'u were pressed and processed almost like a religious act.

> The adhvaryu takes the skin (carma or tvac) and puts on it the filaments or shoots of the Soma (am.s'u). He then takes two boards (adhis.avan.a), puts one on top of the Soma shoots, and beats them with the stones (gra_va_n.a). Then the Soma is put between the two boards, and water is poured on them from the vasati_vari_ pot. Soma is then shaken in the hota_ cup (camasa), wetted again with vasati_vari_ water and put on a stone. Grass is laid on them, and they are beaten so that the juice runs out. The juice is allowed to run into the trough (a_havani_ya), then strained through the cloth (pavitra or das'a_pavitra) which is held by the udgata_. The filtered soma is caught in another trough (pu_tabhr.t). Libations are poured from two kinds of vessels: grahas or saucers, and camasas or cups. [dapted from Haug's notes from Sa_yan.a's commentary on Aitareya Bra_hman.a].

If Soma is electrum and Indra is burning embers (such as charcoal, indha, used in a furnace), the yajn~a can be interpreted, at the material level, as a process of reduction (or, pavitram, purification), using ks.a_ra, of a metallic ore compound (ma_ks.ika_ or quartz or pyrites) to yield the shining metals: potable (pavama_na, rasa-- raso varjrah, cf. RV 9.048.03, i.e. rasa, vigorous as a thunderbolt) gold and silver (hiran.yam and rayi), after oxidising the baser metallic elements (in the unrefined pyrite ores) such as lead (na_ga or ahi or vr.tra) and copper (s'ulba).

Reducing agents include alkaline as well as combustible materials --vegetable and animal products-- such as: herbs (ks.a_ra), barley--grains and cooked pin.d.a, milk, curds, clarified butter, viands (animal fat), bones (used in cupellation processes, and for making crucibles, during the bronze-age), sheep's hair or wool (reminisced as golden fleece).

For e.g., Soma is described as parvata_ vr.dhah in a verse, that the pyrites are from the mountain slopes: 9.046.01 Begotten by the stones the flowing (Soma-juices) are effused for the banquet of the gods' active horses. [Begotten by the stones: or, growing on the mountain slopes].

The part of Soma which is pressed by Adhvaryu (RV. 8,4) is the am.s'u (lit. shoot or stalk). Soma is described as maujavata (RV. 10,34; lit. produced on Mount Mu_javat); also as dwelling in the mountains (giris.tha_) or growing in the mountains parvata_vr.dh: RV. 9,46). In one figure of speech, Varun.a is stated to have placed soma on the rock (RV. 5,85) and in another, the eagle carries off soma from the rock (RV. 1,93). Terrestrial mountains are the abode of soma (RV. 9,2). Soma is the branch of a ruddy tree (RV. 10,94). It is the ruddy or tawny shoot which is pressed into the strainer (RV. 9,92). During pressing with ten reins (i.e. fingers: RV. 6,44), soma is figuratively placed in the heaven, the highest place of the cows (RV. 5,45); other figures of speech are purification with the hands (RV. 9,86), with ten fingers (RV. 9,8.15), by ten maiden sisters (RV. 9.1.6) . Stone (adri; also, as'na, bharitra, parvata, parvata_ adrayah: RV. 8,2; 3,36; 3,35; 10,94).) is used to crush Soma (RV. 9,67; 9,107); pounding is the verb (RV. 10,85). The stones are on a skin ['chewed on the hide of the cow' (RV. 9,79]. The stones are placed on the vedi or altar (RV. 5,31). Ten reins guide the crushing stones (RV. 10,94); ten fingers yoke the stone (RV. 5,43) and hence compared with horses (RV. 10,94).

[R.gveda uses the general technique of pressing using stones, though the process using mortar and pestle is known (RV. 1.28); this latter practice is used by Parsis. Avesta also states that Haoma grows on the mountains].

As a juice, Soma is called the rasa, fluid; and in one hymn it is pi_tu (lit. beverage). [Rasava_da = alchemy].

Atharva veda (AV.IX.6) can be interpreted as providing the clearest statement on the smelting process of the Soma yaja which is echoed in later-day alchemical texts:

"...the shed for housing the Soma cars...green sticks that surround the sacrificial altars (as a fence to restrict the range of fire)...The grains of rice and barley that are selected are just filaments of the Soma plant. The pestle and mortar are really the stones of the Soma press. The winnowing-basket is the filter, the chaff the Soma dregs, the water the pressing-gear. Spoon, ladle, fork, stirring prong are the wooden Soma tubs; the earthen cooking pots are the mortar-shaped Soma vessels; this earth is just the black-antelope's skin...The man who supplies food hath always pressing stones adjusted, a wet Soma filter, well-prepared religious rites...he who hath this knowledge wins the luminous spheres."

Metals were not fully distinguished from their alloys; all carried names such as aes, electrum etc. Ayas meant metal. Asem denoted the natural alloy of silver and gold; it also meant any bright metal made with copper, tin, lead, zinc, arsenic and mercury. Twelve or thirteen different alloys were called asem (Needham, Joseph, Science and Civilization in China, vol. 5, pt. II, p.45) "At Gungeria, in district Balaghat, 102 pieces of silver plates were discovered along with 424 copper implements. The silver was found to be admixed with 3.7% gold (...1100 B.C. - 800 B.C.). The presence of 3.7% gold in these silver pieces indicates the extraction of silver from electrum..." (Smith, V., 1905, Indian Antiquary, pp. 233 ff.; loc.cit. Bharadwaj, H.C., Aspects of Ancient Indian Technology, Delhi, Motilal Banarsidass, 1979, p. 138).

Asem was Soma; this hypothesis will be the running-thread of this review of the alchemical tradition of ancient India, dating back to R.gveda. Hopkins states: "The existence of this alloy (assem) may have been the original cause for the suggestion of transmutation since by adding silver to it, one would get a metal nearly identical with the crude silver from the mine; and by adding gold, something indistinguishable from gold. [The paucity of the Egyptian language may perhaps

have been responsible for a confusion. Gold was the ‘yellow metal’, and the alloy produced was also a ‘yellow metal’.]” (Hopkins, A.J., Alchemy, 1967, pp. 103-104).

The parallels with the Indian alchemical tradition are apparent: tan:kam gold in dravidian-Chinese becomes t.an.kan.a borax (a reagent!) in indo-aryan, t.an:ka gold coin; the terms hiran.yam, hema-bìjam, connote the yellow metal.

“The use of borax (pheng sha) as a preparatory agent for soldering and brazing (in the molten state it cleans metal surfaces by dissolving metallic oxides) goes back in China to the +11th century, for it is mentioned by Su Sung (kho han chin yin)... Li shi-Chen says that borax ‘kills’ the five metals, as saltpetre does; presumably this refers to the preparation of metallic salts. The mild and non-irritant antiseptic quality which has given it such wide use in Western and even modern, medicine, was appreciated by the Chinese pharmacists, who prescribed it for all kinds of external, including phthalic, affections.” (Needham, J., SCC, vol. III, 1959, p. 663).

In the Babylonian Talmud (+2nd century), asemon is a commonly used word referring to bullion (gold, silver or mixed.) Leiden X papyrus (c. +3rd century) says: “no.8. It will be asem, (i.e. electrum, an alloy of gold and silver) which will deceive even the artisans (a tin-copper-gold-silver alloy); no.12. Falsification of gold (a zinc-copper-lead-gold alloy)...” (cited in Needham, Joseph, SCC, vol. 5, Pt. II, pp. 18-21). Soma yajña as a ritual, can be interpreted as an elaborate justification for the memories of processing asemon, asem, electrum.

A Tamil lexicon of Winslow (1862) provides a philological trace: Soma man.al, is interpreted as meaning vel.l.i man.al, sand containing silver ore! Soma, Soma man.al, asemon, asem, electrum may perhaps denote the same substance that dazzled and drew travellers of antiquity in search of indus gold. It may perhaps be the same substance [which required the purificatory ‘mineral waters’] contained in the kaman.d.alu symbols in the icons of the yaks.a legacy. It may perhaps be the same substance said to be am°tam which was considered to be the elixir of life, of

immortality. It may perhaps be the same substance referred to, in sheer poetry, as amritam a_yur hiran.yam. Gold is immortality.

King Soma when pressed is the am.r.ta (or somyam madhu or lit. soma mead (RV. 4,26; 6,20). Very often, the figure of speech for soma is indu (lit. the bright drop). The drop is for Indra to drink (RV. 9,32.38). The seme, su (lit. to press) describes the extraction process of the rasa. Sometimes the seme, duh (lit. to milk) is used. The drops are poured through a strainer of sheep's wool (RV. 9,69) to remove impurity (RV. 9,78). The strainer is a skin (tvac), hair (roman), wool (va_ra), filter (pavitra), ridge (sa_nu or the top of the contrivance). These terms are used with or without an adjective formed from avi (sheep). The stage of passing through the strainer is called pavama_na or puna_na (from seme, pu: lit. flowing clear). The unmixed, purified soma is offered exclusively to va_yu and Indra (va_yu is adored with the epithet: s'ucipa_: drinking clear (soma). As the juice flows, the comparison is with the 'wave of a stream' (RV. 9,80) or just a wave (RV. 9,64). As the juice accumulates in the vat (kalas'a: RV. 9,60), it is compared to a sea (arn.ava: RV. 10,115) or a samudraa (RV. 5,47; 9,64). As water is poured to mix with the rasa, the stalk roars (RV. 9,74). "Like a bull on the herd, he rushes on the vat, into the lap of the waters, a roaring bull; clothing himself in waters, Indu rushes around the vat, impelled by the singers (RV. 9,76.107)." The roar is likened to the roar of a bull ('As a bull he bellows in the wood (RV. 9,7). Soma is brilliant and coloured yellow and hence compared with the rays of the sun (RV. 9,76.86). Gods drink him for immortality (RV. 9,106); soma confers immortality on gods (RV. 1,91; 9,108) and on men (RV. 1.91; 8; 48)gods love the amr.ta (RV. 9,85); all the gods drink soma (RV. 9,109); all the gods become exhilarated (RV. 8,58); soma is immortal (RV. 1.43; 8,48; 9,3). Soma strengthens Indra in his conflict with the hostile powers of the air, with Vr.tra (RV. 8,81); soma becomes the thousand-winning bolt (RV. 9,47), wins a hundred forts (RV. 9,48). Soma is a treasure (rayi: RV. 9,48). Soma is a god pressed for the gods (RV. 9,3).

Cikli_ta soma

Cikli_ta is son of s'ri_, the frequently-purchased one. This is a confirmation of soma as electrum

References are to Usha R. Bhise, 1995, *The Khila-Su_ktas of the R.gveda_ A study*, Bhandarkar Oriental Series No. 27, Poona.

The S'ri_su_kta is a part of the Khila su_kta with 19 verses. Ja_tavedas is invoked to bring in s'ri_. Ka_ty. S'r.S. (4.15.4) suggests the offering of oblation early in the morning in Agnihotra to attain s'ri_. A_p. S'r. S. (4.2.1) notes that s'ri_ is brought by chanting a mantra in the dars'a-pu_rn.ama_sa yajn~a.

Verse 2.6.12 reads as follows:

a_pah sravantu snigdha_ni cikli_ta vasa me gr.he
ni ca devi_ ma_taram s'riyam va_sayam me kule

Trans.: May the friendly waters flow. O oft-purchased (Soma), stay in my house. Make the divine mother Prosperity reside in my family. Bhise notes: cikli_ta is traditionally regarded as the son of s'ri_. The word sound unusual because of the cluster kl. On applying the law of 'ralayorabhedah', the word may be restored as cikri_ra PPP. From the Redup. Base of kri_ 'to purchase'. cikri_ta is soma that is purchased by the sacrificer before he performs a soma-sacrifice. The word, thus, has reference to the ceremony of Somakrayan.a

A second give-away is in Verse 2.6.17 which suddenly refers to 'mud' (which is obviously associated with any quartz ore block with protruding mineral streaks):

kardamena praja_ sras.t.a_ sambhu_ti gamaya_masi
adadha_dupa_ga_dyes.a_m ka_ma_n sas.rujmahe

Trans.: The progeny has been created by the mud. Let us urge it towards prosperity. He (the priest) has deposited (the soma) has approached (the patrons), whose wishes were released by us (towards the gods). Bhise notes: praja_ = of the soma plant; gamaya_masi = releasing the streams of soma in honour of gods leads one to prosperity.

Verse 2.7.1 (a hymn which can be grouped with the earlier s'ri_su_kta):

cikli_to yasya na_ma taddiva_ naktam ca sukrato
asma_n di_da_sa yujya_ya ji_vase ja_tavedah punantu ma_m devajana_h

Trans. O Ja_tavedas, possessed of good mental power, one whose name is Cikli_ta (purchased soma) has by day and night shone for us for companionship and life. May the divine people purify me. Bhise adds: punantu etc.: this line occurs at RV 9.67.27 in the context of purification. Taitt. Br. 1.4.8.1 includes this as a purificatory mantra in the performance of Va_japeya yajn~a.

"The mention of Cikli_ta 'the oft-purchased soma' is a corroborative piece of evidence about the sacrificial set up in which soma is an indispensable element. The adjectives jvalanti_ v.4, pin:gala_ v.13, yas.t.i v.14, undoubtedly refer to soma-plant. Judging as a whole, the hymn (2.6) is a prayer for the prosperity of sacrificial materials like soma, cattle food (pus.t.a) which ultimately yields milk etc. used in sacrifices, a flawless build of cattle, kari_s.a (the dust strewn around sacrificial altar). Only on such assumption can be satisfactory explain the expressions like 'yasya_m vindeyam (vv.2,15), 'manasah ka_mam…va_cah satyam' (v.10) and words like ki_rti, vr.ddhi (v.7). Thus, the connotation of S'ri_, as we get it here, is the prosperity of sacrificial materials and particularly of soma. But there is an undercurrent which believes that S'ri_ is the abhima_nini_ devata_, which is a step towards her deification in the Gr.hyasu_tras where sacrifices are offered to her. Cikli_ta. In the same su_kta, we come across a curious word cikli_ta who is said to be the son of S'ri_ by the tradition; likewise, Kardama and

A_nanda are also believed to be the sons of S'ri_. The origin of this tradition may be traced to v. 12 of the S'ri_su_kta in which cikli_ta has been requested to establish Mother S'ri_ in the house of the poet-seer…The first verse of the next hymn (2.7.1)…Here Cikli_ta has been identified with Ja_tavedas in unambiguous terms. It may be pointed out that the S'ri_su_kta as well as the following two hymns are grouped together, as all of them have Ja_tavedas as their chief deity. V.19, i.e. the concluding verse of the S'ri_su_kta appears also as the concluding verse of both of them. It is a prayer for purification, increase of wealth, freedom from sin and difficulties…In the S'ri_su_kta itself, the brilliance of soma-plant has been emphasized (vv. 4,5,13) and its golden appearance as well. Thus, brilliant appearance also forms a basis of identification of Agni Ja_tavedas and Soma Cikli_ta." (pp. 20-22).

The purification of Cikli_ta soma, the oft-purchased yajn~a ingredient is the road to s'ri_, prosperity.

In the toposheets of Survey of India, close to Sarasvati Nadi_ near Adh Badri is shown a place called Lohargad.h. The local revenue officials informed me for time immemorial, licences have been given to gold-panners in this place who pan for gold from the river-sands of the hiran.yavartini_ Sarasvati_. Buy the quartz and add the vasati_vari_ waters from the Sarasvati_ in the process of agnis.t.oma to yield the purified metal, which is prosperity personified.

Thus, the Khilasu_kta corroborates the arguments provided elsewhere that the reference s to soma in the R.gveda are references to the process of purification of quartz (elelctrum) ore to produce potable gold and silver.

Verse 2.6.1 of the S'ri_su_kta reads:

hiran.yavarn.a_ harin.i_ suvarn.arajatasraja_m
candra_m hiran.mayi_ laks.mi_ ja_tavedo mama_ vaha

Trans.: O Ja_tavedas, bring unto me Prosperity which has the colour of gold, is possess of hari (soma), is wearing a garland of gold and silver, is lovely and full of gold. Bhise notes: harin.i_m: hari stands for soma…The repeated reference to gold emphasizes the brightness of soma. Rajata: the silvery appearance of the soma at night.

One does not have to search for an ephedra or a divine mushroom to gain prosperity processing soma. Any organic plant product would have been reduced to pure carbon if subjected to five days and five nights of incessant firing at around 1500 degrees C. The references to gold and silver in the context of cikli_ta and s'ri_ are clearly direct references to the purchased ore being reduced to the shining, bright, element metals: gold and silver. Ephedra may have become a ritual substitute when the raw-material sources became tough to access as the pastoral metallurgists moved along the banks of River Sarasvati_ and after her desiccation, towards the Helmand, towards the Gan:ga_-Yamuna_ doab and south of Gujarat. The references to asura among the Mun.d.as (near Santal Paraganas), metal workers par excellence may point to a substratum of R.gveda which was nurtured in the Mun.d.a country close to the banks of the River Sarasvati_. Of course, soma is the only (metallurgical, purificatory) process elaborately described in the R.gveda. No wonder, soma constitutes the very essence (rasa; note: rasava_da = alchemy; the term in Ancient Tamil for refined gold is vetaka-p-pon-) of the R.gveda and no wonder, the poet-seer is often seen referring to the devata_s (allegories of the sacrificial materials used in a yajn~a) to bestow him with material prosperity.

Kas'yapa, the eminent r.s.is who adore Soma Pavama_na lived in Kashmir

Hiran.yakes'in (Hiran.ya Kes'i_ya Gr.hya Su_tra I, 22, 14 ff.) notes that the naks.atras, the moon, the seven r.s.is with Arundhati_ and the Pole Star (naks.atra_na_m methi_) should be worshipped at the first installation of fire in the domestic hearth. In 2.19.1 Hiran.yakes'in lists the seven r.s.is, apart from Agastya:

Vis'va_mitra, Jamadagni, Bharadva_ja, Gautama, Atri, Vasis.t.ha and Kas'yapa. Arundhati_ stands between Vasis.t.ha and Kas'yapa.

In Indian tradition, Kas'yapa are associated with Kashmir (Kas'yapa-mi_ra).

The Kas'yapa have over 70% of their r.cas dedicated to Soma Pavama_na. A_pS'S (13.7.5) prohibits th giving of daks.in.a_ to a Kan.va or to a Ka_s'yapa (and reason is not adduced). This is an indication of the incipient dissensions between Kan.va and Ka_s'ypa r.s.i lineage and the lineage of other r.s.is.

The only a_pri_ su_kta for Soma is composed by r.s.i Asita Ka_s'yapa or Devala Ka_s'yapa. [Theother nine a_pri_ su_ktas are dedicated to Agni].

R.si. families of the Rigveda and their A_pri_ Su_kta	
Kan.va (Kevala-An:girasa)	RV 1.13
An:girasa	RV 1.142
Agastya	RV 1.188
Gr.tsamada (Kevala-Bhr.gu)	RV 2.3
Vis'va_mitra	RV 3.4
Atri	RV 5.3
Vasis.t.ha	RV 7.2
Kas'yapa	RV 9.5
Bharata	RV 10.70
Bhr.gu	RV 10.110

The earliest Ka_s'ypa is Ka_s'yapa Ma_ri_ca who offers oblations of Soma to Ja_tavedas:

जातवेदसे सुनवाम सोमम् अरातीयतो नि दहाति वेदः ।
स नः पर्षद् अति दुर्गाणि विश्वा नावेव सिन्धुं दुरितात्य् अग्निः ॥

1.099.01 (R.s.i: Ka_s'yapa Ma_ri_ca) We offer oblations of Soma to Ja_tavedas, may he consume the wealth of those who feel enmity against us; may he transport us over all difficulties; may Agni convey us, as in a boat over a river, across all wickedness.

The following r.cas adoring Soma Pavama_na re also composed by r.s.i Ka_s'yapa Ma_ri_ca:

शर्यणावति सोमम् इन्द्रः पिबतु वृत्रहा ।
बलं दधान आत्मनि करिष्यन् वीर्यम् महद् इन्द्रायेन्दो परि स्रव ॥
आ पवस्व दिशाम् पत आर्जीकात् सोम मीढ्वः ।
ऋतवाकेन सत्येन श्रद्धया तपसा सुत इन्द्रायेन्दो परि स्रव ॥

9.113.01 Let Indra, the slayer of Vr.tra, quaff the Soma on the S'aryan.a_vat, infusing strength into himself, about to show great prowess; flow, Indu, for Indra. [S'aran.ya_vat: a lake in the Kuruks.etra region].

9.113.02 Soma, lord of the four regions, sprinkler (of benefits) flow from A_rjika_effused by a truth-speaking truthful (man) with faith and devotion; flow, Indu, for Indra. [A_rjika_; the country of the r.jika_s].

The reference to s'aryan.a_vat by Ka_s'ypa Ma_ri_ca is significant. A Kan.va called Vatsa also lives on the S'aryan.a_vat:

मन्दस्वा सु स्वर्णर उतेन्द्र शर्यणावति ।
मत्स्वा विवस्वतो मती ॥

8.006.39 (R.s.i: Vatsa Ka_n.va) Rejoice, Indra, at the heaven-guiding sacrifice as S'aryan.a_vat; be exhilarated by the praise of the worshipper. [Heaven-guiding: or, to be offered by all the priests, svarn.are = sarvair r.tvigbhir netavye; S'aryan.a_vat: the country of Kuruks.etra and S'aryan.a_vat is a lake in the neighbourhood].

सुषोमे शर्यणावत्य् आर्जीके पस्त्यावति ।
ययुर् निचक्रया नरः ॥

8.007.29 (R.s.i: Punarvatsa Ka_n.va) The leaders of rites have proceeded with downward chariot-wheels to the R.ji_ka (A_rji_ka) country, where lies the S'aryan.a_vat, abounding in dwellings, and where Soma is plentiful.

Soma comes from both A_rji_ka and S'aryan.a_vat (RV 8.64).

Hillebrandt notes (vol. 1, p. 182):"...we may assume that the s'aryan.a_vat is situated in the land of the pan~ca jana_H, that the Pu_rus were settled in A_rji_ka not far from it, and that a Jamadagni lived quite far form it. [How to reoncile this

with 8.7.29 is not certain. The poet, a Kan.va as is evident from vv. 18,19,32, asks: "The Maruts have come down at Sus.oma, Saryan.a_vat, A_rji_ka and Pastya_vat. When will they approach here the singer who invokes them?" THus it could appear as if the poet did not live at any of these four places, but it is not certain. For he could equally be a priest who offered sacrifices at different places, and thus he could ask: "At such and such a place you (pl.) have heard my call; when will you come this time?"] Sa_yan.a sates hat the lake is situated in the hinterland of Kuruks.etra. If A_rji_ka borders on to Kashmir, or extends up to the mountain valleys, and if S'aryan.a_vat is situated nearby, then we may consider another possibility. The earlier settlements of the Kurus were situated, as Zimmer has shown, near Kamboja in the territory of Kashmir. (H.Zimmer, Altindisches Leben, p. 102). Should it not be the case that an old name from those settlements is preserved in the world s'aran.a_vat, which, limited only to a few passages, occurs in formula-like associations only, and which has already assumed a mythical character in another passage (1.84.14)? If that were the case, s'aryan.a_vat would then be the name of one of the lakes of this land, perhaps the name of the biggest among them, of the Walar. Then A_rji_ka belongs to the southern part of Kashmir and S'aryan.a_vat to the middle part. Here I cannot go beyond a mere conjecture."

S'aryan.a_vat is indeed the root compound from which the term 'Haryana' is derived and given to the State south of the Punjab. The offspring of the waters are noted as:Agni, Kas'yapa and Indra (TS 5.6.1a).

The r.s.i of r.ca RV 9.58.3 is Avatsa_ra Ka_s'yapa, a descendant of Kas'yapa Ma_ri_ca (RV 1.99.1; the only hymn in the su_kta); the r.s.i Avatsa_ra Ka_s'yapa is also the composer of RV 5.44.1-9 .

Another descendant of Ka_s'yapa Ma_ri_ca is Rebha Ka_s'yapa (RV 8.97).

Kas'yapa were the priests of Pu_ru kings Dhvasra and Purus.anti.

ध्वस्रयोः पुरुषन्त्योर् आ सहस्राणि दद्महे ।
तरत् स मन्दी धावति ॥

9.058.03 We have received thousands from Dhvasra and Purus.anti; he the delighted (of the gods) flows rescuing (his worshippers from sin). [Dhvasra and Purus.anti: two kings who conferred great wealth on Taranta and Purumil.ha, to r.s.is of the family of Vidadas'vin].

स हि क्षत्रस्य मनसस्य चित्तिभिर् एवावदस्य यजतस्य सध्रेः ।
अवत्सारस्य स्पृणवाम रण्वभिः शविष्ठं वाजं विदुषा चिद् अर्ध्यम् ॥

5.044.10 (R.s.i: Avatsa_ra Ka_s'yapa) He verily (it to be glorified); let us, with the pleasant thoughts of Ks.atra, Manasa, Avada, Vajada, Sadhri and Avatsa_ra, fill up the invigorating food (the portion) to be shared by the wise. [ks.atra, manasa...: these are the names of the r.s.is].

"The earliest time at which a Kas'yapa is mentioned is that of Ra_ma Ja_madagnya, who, according to brahmani fable, offered a great sacrifice with Kas'yapa as his upa_dhya_ya. The next Kas'yapa is Kan.va Ka_s'yapa, in whose hermitage Sakuntala_ dwelt. She married the Paurava king Dus.yana and was mother of the famous king Bharata. 'Kan.va' is said to have been the chief priest at Bharata's sacrifices, and Bharata gave him gifts...The next Ka_s'yapa was the progenitor of the S'a_n.d.ilyas...The next Ka_s'yapa was Vibha_n.d.aka, who had his hermitage on the River Kaus'iki_ (the modern Kosi in N. Bihar). His son was the rishi R.s.yas'r.n:ga, whom Lomapa_da, king of An:ga, in whose territory they lived, inveigled to his capital to bring rain after a long drrought..." (F.E. Pargiter, 1962

(repr. of 1922 London edn.), *Ancient Indian Historical Tradition*, Delhi, Motilal Banarsidass, pp. 232-233).

Bhr.gu were in Kapa_lamocana on the Sarasvati_ and in A_narta, Gujarat

"The brahman families claimed descent from mythical rishis, of whom there were eight, Bhr.gu, An:giras, Mari_ci_ (whose son was Kas'yapa), Atri, Vasis.t.ha, Pulastya, Pulaha and Kratu...The acount says Bhr.gu begot seven sons, An:giras eight and Kavi eight...it is said, 'Four original families (mu_la-gotra) came into existence, An:girras, Kas'yapa, Vasis.t.ha and Bhr.gu...' (MBh
12,28, 10877-8)...Among the Bha_rgavas Bhr.gu and Kavi are purely mythical, but as regards Us'anas-S'ukra, who is called their son, it must be noted that Us'anas and S'ukra were names of the planet Venus also, and the two must be distinguished. The rishi always appears as th great priest of the Daityas and Da_navas and as the antagonist of the second Br.haspati with the same chronological position...there is no mention of any rishi called Kas'yapa until Ra_ma Ja_madagnya's time...The vams'a of the Bha_rgavas is set out in Va_yu 65, 72-96, Brahma_n.d.a 3.1.73-100 and Matsya 195.11-46...Maha_bha_rata account says (1.66.2605-13) Bhr.gu had two sons, S'ukra-Kavi-Graha who was guru of the Daityas and gods (sura), and Cyavana; Cyavana married Manu's daughter A_rus.i_ and had a son Aurva: Aurva's on was R.ci_ka, who had a hundred sons,the eldest of whom was Jamadagni...

"Cyavana's family and Us'anas-S'ukra's family appear to have occupied different regions. Cyavana is always connected with the west of India, the country around the Gulf of Cambay, in or near S'arya_ti's territory A_narta (Gujarat) as shown by the story of his marrying Sukanya_, and by the statement that he perormed austerities near the Vaidu_rya Mts (the west portion of the Satpura range) and the River Narmada_. Us'anas-S'ukra is connected rather with the central region of N. India, for Yaya_ti king of Pratis.t.ha_na (Allahabad) met his daughter Devaya_ni_ near his own territory and married her; and Kapa_lamocana on the Sarasvati_ is called his ti_rtha. Cyavana's descendants remained connected with west India, and

when the Haihayas dominated that region and the S'a_rya_ta kingdom perished, they became associated with the Haihayas. It is they who produced the great Bha_rgava family..."(F.E. Pargiter, 1962 (repr. of 1922 London edn.), *Ancient Indian Historical Tradition*, Delhi, Motilal Banarsidass, pp. 185-190).

"The Post-Rigvedic situation...The extent of their domination is almost incredible, and i starts with a near monopoly over the Vedic literature itself: the only recension of the RIgveda that is extant today is a Bhr.gu recension (S'a_kala); one (the more important one) of the two extant recentions of the Atharvaveda is a Bhr.gu recension (S'aunaka); one (and the most important one) of the three extant recensions of the Sa_maveda is a Bhr.gu recension (Jaimini_ya); and one (and the most important one among the four Kr.s.n.a or Black recensions) of the six extant recensions of he Yajurveda is a Bhr.gu recension (Taittiri_ya)...the author of the Ra_ma_yan.a is a Bhr.gu (Va_lmi_ki). The author of the Maha_bha_rata, Vya_sa, is not a Bhr.gu (he is a Vasis.t.ha), but his primary disciple Vais'ampa_yana, to whom Vya_sa recounts the entire epic, and who is then said to have related it at Janamejaya's sacrifice, whence it was recorded for posterity, is a Bhr.gu...In the Pura_n.as, the only R.s.i to be accorded the highest dignity that Hindu mythology can give any person -- the status of being recognised as an avata_ra of Vis.n.u -- is a Bhr.gu (Paras'u-Ra_ma, son of Jamadagni)...in the Bhagavadgi_ta_, Krishna proclaims: 'Among the Great R.s.is, I am Bhr.gu; and among words I am the sacred syllable OM...' (Bhagavadgi_ta_, 10.25)." (Shrikant G. Talageri, 2000, The Rigveda: A historical Analysis, Delhi, Aditya Prakashan, pp. 174-175).

"...Bhr.gu, the progenitor of this clan, traces himself back to Varun.a: the statement, bhr.gur vai va_run.ih, is well known to the Veda. (S'Br 11.6.1.1; TA_r 9.1.1.6; Abr 3.34.1: yad dviti_yam [praja_pate retasa_] a_sit tad bhr.gur abhavat, tam varun.o nagr.hn.i_ta tasma_t sa bhr.gur va_run.ih)...They kindle Agni with Stomas 10.122.5; 1.127.7...Other R.gvedic passages...7.18.6, where the Bhr.gus and the Druhyus are mentioned as the obedient clans, and 8.3.9; 6.18, where they, or other prognitor Bhr.gu, and the Yatis are losely onnection, and mentioned as the worshippers of Indra...The earlier attempts to onnect them with Gr. phlegyes seem

to be justified...They defeat Makha (9.101.3) [In 4.16.20 (also 10.39.14) they are praised as master chariot-makers. This seems to be an instance of confusion between the Bhr.gus and the R.bhus, as the PW remarks], are called dhi_ra (10.46.2), somya (10.14.6), and mentioned together with Apnava_na (4.7.1), with the An:girah Pitarah, Navagvas and Atharvans (10.14.6) and parallel to different gods (8.35.3)...They are seers of the Sa_mans, but not so often as the An:giras' (TMBr 14.3.23; 9.39; cf. RV8.3.16 stomebhih; 6.18: tus.t.uvuh)...a Cyavana Bha_Rgava who consecrates S'a_rya_Ta Ma_nava (ABr 8.21.4), a 'Bhr.gu' who is killed by te Sr.n~jaya Vaitahavyas (AV 5.19.1) and Vidanvat (TMBr 13.11.10)...They are to act as the Hotr. in the Das'apeyakratu(TS 1.8.18; TBr 1.8.2.5; TMBr 18.9.2; S'S'S 15.12.2)-- an allusion to the existence of a particular gotra...

"The legend according to which the Bhr.gus and the A_dityas originate from the flames, whereas the An:giras' from the coals of the semen of Praja_pati, insignificat in itself, still shows the difference between the Bhr.gus and the An:giras' (GBr 1.2.8 is rather obscure because of the corrupt text). [Alfred Hillebrandt (*Vedic Mythology*, 1981, vol.1 (repr.), pp. 115-118].

R.gveda riddled with allegory and metaphor enters the philosophical domain with these descriptions of Hiran.yagarbha. Post-Rigvedic texts and philosophical tracts abound in references to Hiran.yagarbha as attested by J. Gonda (opcit., ppo. 217-246). Ma_nava S’rautasu_tra (MS. 6,2,3,9) stipulates the use of stanzas 1,3, 2-7 of RV. 10,121 (Hiran.yagarbha su_kta) in connection with the naturally perforted ‘brick’ (agnicayana). It has been argued elsewhere that the perforated bricks are integral to the later-day alchemical processes of transmuting baser metals into gold. (Kalyanaraman, *Indian Alchemy: Soma in the Veda*, in press)

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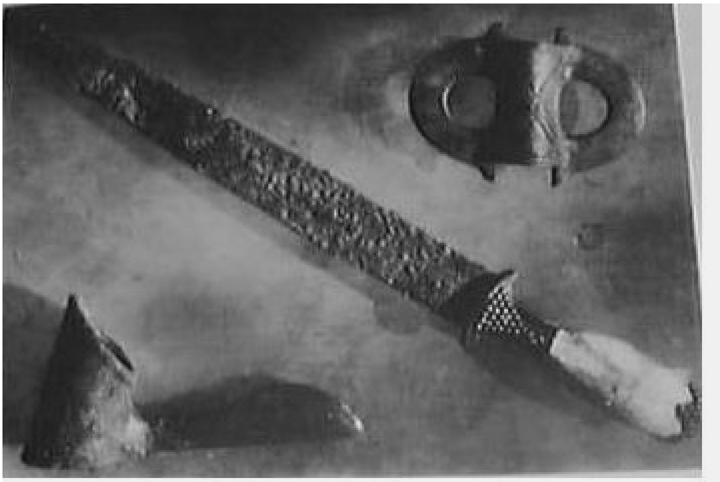
Section 5 River Sarasvati: Bronze-age Bha_rat

Fire-workers, metal-workers, and armourers

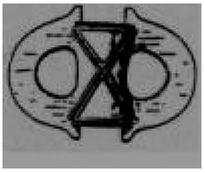
The Early Harappans of the 4th millennium BC, seem to have been involved in the minerals and metals economy. It is notable that sixteen furnaces were discovered on Mound F of Harappa. The civilization is most significantly a metals economy: excavations have produced 2000 metal artifacts at Mohenjodaro and over 1000 at Harappa. The metals were: copper-bronze, gold, silver, lead and more rarely electrum. Some necklaces or belts contain hundreds of metal beads. Metal tool types were: points, knives, chisels, needles. Tin-bronze alloying was used for knives, axes and chisels. Metal additives were not used for tools such as points, razors and fishhooks.

The trace impurity pattern of copper from the Khetri copper mines (nickel and arsenic content) compare with the Harappan artifacts. Ganeshwar copper mines ascribed to the third millennium B.C. (Sikar district, Rajasthan) are located in the Drishadvati (Ghaggar-Hakra-Wahinda) system. R.C. Agrawala made a remarkable discovery in 1977: an examination of the 60 flat copper celts (20 to 25 cms. Long) from a 'hoard' in Neem-ka-thana in Sikar district of Rajasthan were associated with the Indus Valley complex. Ganeshwar is about 15 kms. from Neem-ka-thana; at this place, copper axes had been made more than four thousand years ago. This site is 250 kms. from Kalibangan and 160 kms. from Bhadra. Both Kalibangan and Bhadra are in Ganganagar district of Rajasthan. By 1979, after further diggings, 1000 copper objects (arrow heads, rings, bangles, spear heads, chisels, balls, celts) had been found in Ganeshwar. Arrowheads, thin blades and fishhooks and other characteristic Indus civilization metal artifacts were also found. Rich copper ores are also said to exist in Afghanistan, at Tezin, east of Kabul, Musai in the Shadkani Pass and the Silwatu Pass (Forbes, 1972, p. 13).

Copper tablets found in Mohenjodaro are incised with pictorial motifs and script signs. The historical periods record the evidence of the use of copper tablets to authenticate title deeds or property transactions. Only a metal-smith had the competence to inscribe on copper plates. He is **kut.ha_ru**, the writer, armourer, depicted by the zebu or bra_hman.i bull, **ku~t**. Perhaps, he was the ku_t.aka or the chief of the village or artisan community. A double-axe is pictured on a Chanhudaro seal, on a Mohenjodaro copper plate and finds a parallel with the find in Mesopotamia. There are also tablets shaped like double-axes. Inscriptions also occur on metal weapons, rods and blades.



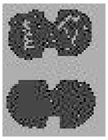
Double-axe found at Ur, Mesopotamia (loc.cit. Childe, 1950). The photo shows the double-axe, a sword and a battle-axe found in the grave of a warrior, Mes-kalam-dug at Ur. The gold dagger had a hilt made of lapis lazuli. And a filigree sheath. Also found was an electrum helmet, ca. 3000 BC. The grave chamber had: a shield, two gold-mounted daggers, chisels and other tools, copper jugs, silver bowls and a set of arrows. He wore a broad silver belt from which hung a gold dagger and a whetstone of lapis lazuli. The coffin had been covered with a mass of beads of gold and semi-precious stones. Golden bowls were placed between the corpse's hands, near his feet elbow and behind his head, and by the right shoulder there was a double axe-head of electrum.



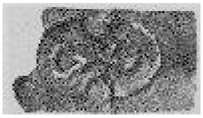
The double-axe of Ur had a remarkable parallel in the inscriptions of the Indian civilization: (1) on a copper plate from Mohenjodaro; and (2) on a seal from Chanhudaro.
Copper plate, M-592 a,b Mohenjodaro

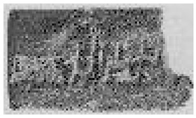


C-023 Chanhudaro Seal. [Note the double-axe dominating the field, together with an antelope].



Text 4407 (Mahadevan concordance); inscribed object





(Freq. 17) shaped like a double-axe.

It would be reasonable to hypothesise that many seals and tablets were the possessions of the workers and warriors of the civilization and that the messages might be similar to the messages conveyed in later-day traditions of the historical period, of conveying property rights through ‘copper-plate grants’. Impressions on copper and bronze have been used in the case of coppert-plates, since these plates intended to be permanent records. Fleet notes that most of the seals attached to the copper-plate records are of bronze rather than of copper (Fleet, J.F., 1907, ‘Epigraphy’, *The Imperial Gazetteer of India*, *The Indian Empire*, II, p. 26). The copper-plates were in vogue in the Gupta period. In *Bhojaprabandha* (verse 162), the poet notes that the scarcity of copper was caused by the issue of copper-plate grants, ta_mra s’a_sanapatra.

During the historical periods, an iron handle from Nalanda was found to have been inscribed with the sign, ‘svastika’ and letters which were read by Jayaswal as ‘jaya’. The inscription was in Bra_hmi characters of ca. 200 AD. Jayaswal surmised that the iron rod was used for branding cattle. (*Journal of the Bihar and Orissa Research Society*, XXIII, p. 128). In the historical periods, clay sealings were attached to letters and documents with a view to holding together the string or

tape tied round the object once or twice, as is the case with the present-day lac or wax seals. The ends of the string, after passing it around the object, were drawn in (between the string and the tablet) and the seal was so placed as to cover the ends. (Thaplyal, Kiran Kumar, 1972, *Studies in Ancient Indian Seals*, Lucknow, Akhila Bharatiya Sanskrit Parishad, p. 13).

Bronze Age metallurgy

Jim Shaffer underscores a remarkable feature of the Harappan material culture: "One of the most striking aspects of Mature Harappan material cutlture is the quantity of metal objects. Excavations produced almost 2000 metal artifacts at Mohenjodaro over 1000 at Harappa…Even the small Harappan site of Allahdino has a tremendous number of metal artifacts. Types of metal smelted by the Mature Harappans included copper bronzes, gold, silver, lead and more rarely electrum….(At Allahdino), it appears that except for obvious items of jewelry, metal artifacts were manufactured for use in daily activities and were available to a braod segment of Harappan society, urban or rural." (Jim G. Shaffer, Harappan Culture: A reconsideration, in: Gregory Possehl, ex., *Harappan Civilization*, 1982, p. 46).

The malleability of unalloyed copper, which renders it too soft for weapons, helps form vessels of every variety of form. Copper domestic vessels were regularly made in Sumer and Bha_rat during the 4th millennium BC, and in Egypt during the third millennium BC.

This provides a perspective for the dawn and development of the bronze age in the Sarasvati-Sindhu civilization, with the import of tin from sites in Hazaribagh, Bihar and sites close to the Euphrates river (Sumer) to alloy with the copper available from the Khetri mines in the central Sarasvati river basin.

Copper materials contained different percentages of copper, antimony, arsenic, nickel, sulphur, lead and iron. The bronze materials contained copper, tin, arsenic, iron, nickel, sulphur with traces of antimony.

Mohenjodaro

Bronze chisel	Cu 86.22; Sn 12.38
Copper lump	Cu 98.80
Bronze button	Cu 89.10 Sn 10.60
Bronze rod	Cu 69.76 Sn 6.65 Pb 22.83
Celt bar	Cu 91.40 Sn 7.66
Chisel bar	Cu 87.66 Sn 9.14
Celt bar	Cu 94.19 Sn 2.06 As 2.45
Bar	Cu 88.39 Sn 8.70As 1.60

Harappa

Bronze celt	Cu 91.15 Sn 7.85
Helmet sheet metal	Cu 97.69 Sn. 0.15 As 1.19
Bronze chisel	Cu 91.32 Sn 7.85
Bronze needle	Cu 88.79 Sn 8.75 Fe 1.37

Other sites

Mundigak Pd. 1	Cu 98.79 Sn 1.06
Nal	Cu 93.05 Pb 2.14 Ni 4.90
Jorwe axe	Cu 99.00
Chandoli spearhead	Cu 96.39 Pb 1.55 Fe 1.23
Navdatoli axe	Cu 93.17 Sn 3.26 Pb 2.28
Somnath axe	Cu 81.86 Sn 12.82 Pb 1.21 Fe 2.57

Kish

Period A	Cu 94.01 Sn 0.43 Ni 3.34
A-mound	Cu 88.16 Sn 4.65Fe 6.16
Khafaje	
Pin, 850 (Kh. III)	Cu 87.50 Sn 10.64 As 0.68
Ur	
Royal cemetery	Cu 85.13 Sn 11.78 Pb 1.13 Fe 1.71
Ur B	Cu 85.13 Sn 11.78 Pb 1.13 Fe 1.74

It is seen from this evidence that both arsenic and nickel are present also in west Asian artifacts. There are indications for extensive use of oxide ores and native ores as distinct from sulphide ores. Copper slag from Ahar had the composition dominated by oxides: SiO_2 28.16; FeO 45.32; MgO 3.02; Al_2O3_3 5.96 MnO 1.82 CuO 0.91 SO_3 4.15

Spectroscop;ic analysis of Indian ores and two Harappan artifacts suggests the close correspondence with the Khetri ore impurity pattern.

Among the most common weapons are the knife, chisel and axe; only 14 % of the bronze tools and weapons contained tin in the optimum level of 8 to 12 %, thus indicating the evolving knowledge of improving ductility and strength of alloys by varying the mixture of copper and the alloying ore (tin or arsenic or lead). About 6 % of the tools and weapons had lead alloying.

Thousands of gold beads have been discovered. There are indications that silver was extracted from argentiferous galena (lead + silver ores). Gold and silver ornaments were soldered with such remarkable artistry that the joints are not visible.

Explorations by Wakankar of Vikram University, Ujjain have revealed a large number of settlements of early farmers of central India. A new chapter has been opened in India's proto-history by the discovery of chalcolithic sites dated to the early second millennium BC, for e.g.: Nagda, Eran, Kayatha. (Wakankar, V.S., *Kayatha Excavation, Special no. of the Vikram University Journal*, Ujjain, 1967).

Moulds were made of refractory clay or stone with depression to receive molten metal. The finds of Chanhudaro axes with puckered surfaces and large blow-holes indicates that difficulties were encountered in casting. (Mackay, E.J.H., 1943, pl. cxxvii: 36,40). Closed moulds were employed using two or more fitting pieces of stone; so were the cire perdue or lost wax techniques of casting used as evidenced by the dancing figurines found in Mohenjodaro, bronze animal shaped amulets and bronze hair pieces. (Mackay, 1938, pl. lxviii:50; pl. lxxix:5,6,19; pl. c: 10; Marshall, 1931, pl. cxxxv:34). Repeated hammering was used to raise and sink the metal flast disk of copper or bronze placed around a block of wood. Tools such as razors, arrowheads, even knife blade were made by chiseling out from copper sheets. Metal was joined by 'running on' technique, i.e. by pouring molten bronze to fuse, as evidenced by the method used to join a tanged sword and its butt. Rivetting was used to join a rod at both ends at Mohenjodaro (Marshall, 1931, p. 369).

Hegde concluded that the metallurgical techniques had evolved even during the chalcolithic period. The stages are: recrystallization (bending or punching below a specified temperature; pure metals melt at 280^0 C); annealing (beating above recrystallization temperature and then cooling down slowly); casting (heating to a temperature 1150^0 C to produce good copper and keeping this molten copper completely covered under burning charcoal); smelting (extraction of copper from ore which has less than 5% copper)l; dressing (concentration by floatation process; perhaps band picking and winnowing as is done ly *loharies* at present); roasting (roasted at 500^0 C to remove impurities of sulphur and arsenic for good casting and to avoid brittleness); and poling (reducing the percentage of copper oxide by

inserting green hard wood into the molten metal). To attain a temperature of 1200^0 C, a hearth blown by bellows, as presently used by blacksmiths, and blow pipes (to solder) were perhaps also used. (Sankalia, 1979, p. 50; A.K.Bag, 1985, *Science and Civilization in India*, New Delhi, Navrang, p,85).

Numerous arrowheads of copper or bronze have been found at the Harapan sites. (Mackay, 1938, *FEM*, I, p. 461; Pls. CXXI, 1-5; CXXV, 42-7; CXXVII, 7-11; CXXXI, 18; CXXXII, 28-30; Vats, 1943, *EH*, I, p. 391; II, pl. CXXV, 13 *and 14; Wheeler, loc. cit., p. 58, fig. 10,11; copper arrowheads at Lothal: Indian Archaeology*, 1954-55, p. 12; 1957-58, p. 13, Pl. XXIA). The flat pieces of copper had long narrow barbs with the shaft perhaps providing the midrib. The average length and breadth of the arrowheads found at Mohenjodaro were 1.9 inches and 0.64 inches. Spear-heads were found tanged, thin, flat and leaf-shaped blades, the split –ends of the shaft might have acted as the mid-rib. Two holes found near the base of the blade might have facilitated binding to the shaft. Four or five blades found at Mohenjodaro were upto 18.5 inches long, double-edged and heavy. (Mackay, opcit., I, pp. 466, 467; II, Pls. CXIII,3; CXVIII,9; CXX, 17; CXXVIII,5; CXXXI, 19; CXIX,9). These may be called short swords or dirks. Also found were daggers or knives. (Vats, opcit, I, pp. 86,87). The daggers or knives had long tangs and slightly sinuous recurved points and edged only on the convex side; the cutting-edge is sharp. A double-edged dagger-tip with a midrib was found at Harappa. (Vats, opcit., p. 89: comparable to the Fatehpur daggers). Found at Mohenjodaro were double-edged knife-cum-dagger blades useful both for thrusting and cutting. (Mackaqy, opcit., I, p. 465; II, Pls. CXIX,4; CXX, 15-21; CXXVII,3; CXXIX,1; CXXXIII,32). Two bronze daggers had a definite mid-rib. Flat axes without a shaft hole were found at Mohenjodaro, Harapa, Lothal and Rangpur. (Marshall, opcit, II, pp. 494, 495; Pls. CXXXVIII and CXXXIX; Mackay, opcit., I, pp. 453,454; Vats, opcit., I, p. 86; Lothal: *Indian Archaeology*, 1957-58, p. 13, Pl. XXIXA; Rangpur: *Indian Archaeology*, 1953-54, p. 7). The short axes with a deep and circular edge suggest the use as weapons of war. (Vats, opcit., I, p. 86). A bronze shaft-hole axe was found at Chanhudaro. (Mackay, Chanhudaro, p. 188). Another was found at Shahi Tump in South Baluchistan (A. Stein, An

Archaeological Tour in Gedrosia, Pl. XIII, Sh.T. VII, 135). A combined axe-adze was found at Mohenjodaro. This was a weapon of war (Mackay, FEM, II, Pls. CXX,27; CXXII, 12).

"The flat copper and bronze axes present in the Ganges basin and at Gungeria, are similar in general terms to the flat axes of the Harappan culture...It seems that there was an initial diffusion of metallurgical techniques eastwards from the Indus Valley, even though most of the Gangetic tools and weapons owed their origin to local inventiveness. The finds of these weapons may be contemporary with the last days of Harappa or the period immediately following its fall...In the Battle of the Ten Kings too, spears can be recognized in the word srakti. (RV 7.18.7). And sr.ka is used in a couple of R.gvedic passages to designate a wepon of Indra, a lance. (RV 1.32.12; 10.180.2)...Vajra is a fatal weapon made of metal, ayas. (RV 1.52.8; 8.96.3; 10.113.5). It is forged by the smith-god, Tvas.t.r. (RV 1.32.2; 5.31.4; 10.48.3)....The pra_sa has a broad and sharp head and must be a spear or javelin. Occasionally, a pra_sa is described as having a barb or handle, and in the Bhi_s.ma parva we hear of maha_pra_sas hurled by horsemen on the field of battle...The pat.t.is'a appears to denote a spear...Kunta and kan.apa likewise signify projectile weapons of the same order...And the bhin.d.ipa_la is probably a short javelin thrown by the hand...The words employed to denote a sword are asi, khad.ga, nistrim.s'a and karava_la (MBh. 1.26.44; 5.19.3)...The battle-axe, designated as paras'u, paras'vadha or kut.ha_ra (MBh. 5.152.7) is farily common...The kut.ha_ra was a favourite weapon of Paras'ura_ma. The discus or quoit (cakra) is indeed a very ancient weapon, harking back to the R.gveda, where it is mentioned as a weapon of Indra. (RV 8.96.9)...The words commonly used to denote a club or mace are gada_, musala, and parigha. (MBh. 1.17.16; 1.28.12; Ra_m. Aran.ya. 26.10.11 speaks of parigha with iron prickles)...The beginnings of fortification in India can be traced as far back as the prehistoric age. At Kot Diji, fifteen miles south of Khairpur and 25 miles east of Mohenjodaro, a fortified town of pre-Indus date has been laid bare by recent excavation, with a strongly walled citadel armed with rectangular towers of stone and mud-brick ...At Kohtras Buthi, in Sind, N.G. Majumdar discovered a fortified site of the Amri culture, slightly earlier than the

Harappan. (Majumdar, *ASI, Annual Report, 1930-34*, p. 102)...As one goes up the southern slope, one comes across first a low rampart wall, and next a second wall, larger and stronger than the first. The latter wall is made of cyclopean masonry, and shows traces of four ruined bastions with an entrance on the south-east. Professor Piggott likens the site to a 'promontory fort', and compares it with the fortificatgions on the Tharro Hill, also in Sind. Here too, fortifications take the form of double walls, curved and of massive construction and 250 feet apart...At Sutkagen-dor in Makran, Stein found massive fortifications enclosing an area about 170 yards by 125 yards, in association with Harappan pottery...Recent excavations at Kalibangan on the left bank of the Ghaggar in Northern, over which stood the relevant buildings. The latter mound perhaps represents a citadel...The epithet a_ma_ may sometimes refer to unbaked Rajasthan have brough to light an important center of the Harappan Civilization...The smaller mound contained a massive mud-brick platform (literally 'raw') brick walls. The word dehi_ is used in the R.gveda, in the sense of ramparts or defensive walls, with palisades and a ditch...The R.gveda mentions the pu_rpati, 'lord of the fort' (RV 1.173.10)...Macdonell and Keith hold that he was the chief of a fort under attack. (*Vedic Index*)...The R.gveda contains repeated prayers to Agni to preserve the faithful with 'forts of ayas' (RV 1.58.8) and to 'be unto us a wide, broad ample castle'. (RV 1.189.2; TS. 1.1.14-4; 7.16.10)...In the Bareilly districtg of UP, the ruins of Ahicchatra_, the capital of North Pa_n~ca_la in antiquity and mentioned in the Maha_bha_rata, dominate the plain around with lofty ramparts 3 ½ miles in circuit. Excavations in 1940-41 revealed two successive earthen ramparts below a stout wall of baked brick. Painted Grey Ware was found both below and within the earlier rampart, which can easily be placed earlier than the fifth century BC...the art of iron-smelting came to India from Anatolia about 1000 BC, presumably through the agency of itginerant smiths. Iron appears in association with the P.G. Ware at a number of sites and precedes the arrival of the NBP Ware at a few others. By about 500 BC, fully iron-using cultures flourished as far south as Amara_vati_. The Vedic testimony fully agrees with the discoveries of archaeology and appears conclusive on the point." (Wheeler, *Early India and Pakistan*, pp. 106-7)."(Sarva

Daman Singh, 1965, *Ancient Indian Warfare*, Delhi, Motilal Banarsidass, pp. 85-134, 169)

Lead is plentiful in Mohenjodaro (Marshall 1931: 524)... Rajasthan (Rao 1973: 116), Bihar and Orissa (Marshall 1931: 675) contain several silver-bearing lead deposits; but these are small... the Ajmer and Jawar mines in Rajasthan are likely sources for these metals... Gold mines at Kolar and Anantapur also yield silver with gold, but not in quantity enough for commercial purposes... Lead mines, which could have been a source for silver as well, are situated in Faranjal in the Ghorband Valley of Afghanistan and are common in southern Afghanistan, especially at Hazara Jat. Well-known silver mines are also known to have existed near the head of the Panjsher Valley in the southeastern Hindu Kush and in the vicinity of Herat... Lead was added to copper to increase the feasibility of molding and has been extensively reported in Harappan artefacts (Agrawal 1971: 156)... Lead might have been used mainly as a smelting flux. This is evident because of the discovery of copper ore together with a small piece of lead in a bricklined pit in a house at Mohenjodaro (Mackay 1938: 41)...

Rajasthan copper mines are at Khetri, Singhana, Kho-Dariba (Alwar), Delwara Kirovli (Udaipur) and Debari (Udaipur) (Seth 1956)... spectroscopic analysis of the Harappan artefacts and various ores shows that there is a close correspondence with the Khetri mines (Agrawal 1971: 175)... there are copper celts, Indus arrowheads and pottery of the third millennium B.C. (Agrawala 1978, 1979) from Ganeshwar (Sikar District)... Khetri is only 60 kilometres from Ganeshwar... There are copper deposits in Zhob district (Mughal 1970: 194), Robat (Hunting Survey Corporation 1961) and Shah Bellaul (Forbes 1972) area of Baluchistan... Huan Tsang mentions copper mines in Afghanistan and ancient workings have been located near the Safed-Kuh between Kabul and Kurram (Forbes 1972: 13). Shah Maqsud also contains rich veins of copper ore and it is said that Nadir Shah exploited them (Forbes 1972: 13). Rich ores are also said to occur at Nesh, 100 kilometers from Kandahar. Other localities are Tezin, east of Kabul, Musai in the Shadkani Pass and the Silwatu Pass (Forbes 1972:13). Iran is rich in copper, and metallurgy has a long

tradition going back to the fifth millennium B.C. at Tal-i Iblis in Kirman (Caldwell 1967). The best mines are in Kirman as well as Kal-seb Zarre, Sabzwar and Cahr Daud near Meshad, Kaleh near Astrabad and in Elburz mountain districts of Kashan Kohund and Isfahan and Anarak (Wertime 1968)... Kyzyl Kum desert has a copper industry at Temba Bulach but this is of uncertain antiquity (Kalesnik and Pavlenko 1976). The eastern Iranian border also has a long belt of copper deposits...

The ore cassiterite yielded tin. Antimony was another alloy with copper to make bronze; antimony was derived from Caucasian ores. Arsenic was also used as an alloy to yield brass.

Stein collected a few bronzes from Shahi Tump, Mehi, Siah Damb and Segak Mound, all of which have a high tin percentage... tin was a precious commodity as is evident from the findings of bronze scraps, stored along with other valuables in copper vessels at both Harappa and Mohenjodaro (Vats 1940: 381; Marshall 1931: 488). According to Agrawal (1971: 168) only 14 percent of Harappan tools were alloyed in the optimum range of 8 to 12 percent tin. Furthermore tin bronze is more abundant (23 percent of the tools) in the upper levels of Mohenjodaro than in the lower levels (6 percent)... Tin deposits known in India are located in Palampur region of Maharashtra, Dharwar district in Karnataka and Hazari Bagh District of Bihar (Marshall 1931: 682). Bhilwara in Rajasthan and Hosainpura in Gujarat are also known to have a limited quantity of tin (Chakrabarti 1979: 70). Outside India, on the western frontier, tin is known to occur in Kuh Banan, Karadagh and Khorasan (Marshall 1931: 483-484; Vats 1940: 378-82) between Astrabad and Shah Rud in Iran (Gowland 1912) and between Bukhara and Samarkand in Soviet Central Asia (Crawford 1974; Masson and Sarianidi 1972: 128)... The main supply of tin may... have come from the western regions: Khorasan and the area between Bukhara and Samarkand (Chakrabarti 1979: 70) through sites like Shortugai... Tin was one of the commodities which the Sumerians got from Meluhha (Leemans 1970; Muhly 1976: 306-307)... it is possible that tin was basically a trading item

which the Harappans were obtaining from Khorasan and Central Asia for export to Mesopotamia, just as they obtained lapis lazuli from Badakshan for export there...

Based on the presence of arsenic, nickel and lead in artefacts from Mohenjodaro and Harappa, Ullah (1940) determined the sources of their copper to have been Khetri, Alwar, Singhbhum and Afghanistan mines where nickel and arsenic both are supposed to be present in the copper ores. He held that the Sumerian ores could be distinguished from Indian ores since the former are virtually free from arsenic (Ullah 1940)... Agrawal’s Table 11 (1971) shows that at Khafaje and Ur, 88 percent of the artefacts contain arsenic.

...literary sources... sources of silver, including Dilmun, Aratta, Elam, Marhashi and Meluhha, all of which are to the east or south of Mesopotamia, Sargon of Akkad referred to a locale in Anatolia as the ‘Silver Mountain’...

Armourers’ repertoire

Almost identical bronze carts discovered at Chanhu-daro and Harappa, seem to indicate a common manufacturing origin.

The Harappans were metal forgers, smiths and craftspersons capable of producing weapons, tools, instruments, pots, toys, jewellery and decorative pieces of metal.

1. Spear and lance heads and arrow heads. These weapons occurred at alllevels at Harappa, Lothal, Kalibangan and Chanhudaro. Chanhudaroarrowheads are made from sheets of .02 to .05 in. thickness and have backward projecting barbs. The Lothal arrowheads are thin and without a barb.

2. Knives. Knives occur in a variety of shapes: triangular with leaf-shaped blades with curved ends, plain, narrow, straight; some have curved edges and some have rectangular sections.

3. Swords and Dirks. These have a pronounced mid-rib and thick tang with holes located at the base of blade or on the tang itself.

4. Blade axes and celts. Long, short, narrow, broad. Some are flat copper celts with a lenticular cross-section, broken butt, slightly concave sides and sometimes concentric working edge. A shouldered celt and a sleeved copper which is perhaps a precursor to the anthropomorphic copper hoard were found.

5. Socketed axes. Mohenjodaro and Chanhudaro. The axe from Chanhudaro is made of bronze and perhaps belongs to the Zhukar period.

6. Maces. Pear-shaped copper maces.

7. Razors. Of several shapes.

8. Chisels. Of several shapes and in relatively large numbers. Sizes vary from short to long, sections vary from rectangular, round to square. The edges are doubly sloped, abrupt and occasionally displayed. Typical ones are with broad, rectangular sectioned tangs and narrow blades.

9. Saws. Bronze. With very regular, small teeth. Was proably fixed with a wooden handle with 2 or 3 rivets placed wide apart. Circular saw was found at Lothal and was perhaps used to cut grooves in cylindrical objects.

10. Sickle blade. Infrequent occurrence.

11. Tubular drills. Coghlan refers to these as the earliest examples in the world.The drills are the tapered tubes of thin copper and bronze. The groove left between the core and the wall varies in width indicating variance in thecircumferences of the tools. A twisted drill, the fore-runner of the modern drillwas found at Lothal.

12. Fish hooks. Made of sheet copper with an eye on the top and a barb at thepointed end. A few unbarbed fish hooks have also been found. Metallicfish-hooks are the earliest examples found anywhere in the world.

13. Others: awls and reamers, mid-ribbed swords, mirror, gouges, net sinker, needles, crapers, daggers and shovel

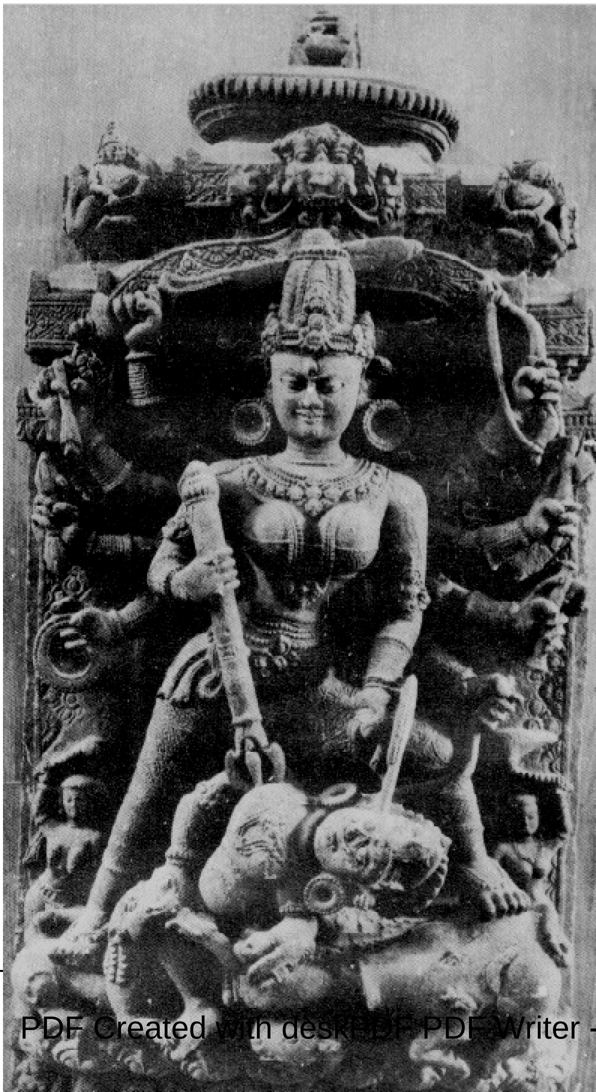
Quarters of the lower city in Mohenjodaro seem to have housed artisans specializing in different crafts indicating the possibility of occupational specialization among the fire- and metal-workers. Copper and bronze were used for making tools and implements. These included flat oblong axes, chisels,knives, spears, arrowheads , small saws, and razors. All these could be made by simple casting, chiseling, and hammering.Four main varieties of metal have been found: crude copper lumps in the state in which they left the smelting furnace; refined copper, containing trace elements of arsenic and antimony; an alloy of copper with 2 to 5 percent of arsenic; and bronze with a tin alloy, often of as much as 11 to 13 percent. The copper and bronze vessels of the Harappans are among their finest products, formed by hammering sheets of metal. Casting of copper and bronze was understood, and figurines of men and animals were made by the cire-perdue (lost-wax) technique.

Other metals used were gold, silver, and lead. Lead was employed occasionally for making small vases and such objects as plumb bobs. Silver is relatively more common than gold, and more than a few vessels are known, generally in forms similar to copper and bronze examples. Two examples of silver seals have been found. Gold was generally reserved for such small objects asbeads, pendants, and brooches.

Gold was almost certainly imported from the group of settlements that sprang up in the vicinity of the goldfields of northern Karnataka, because the composition indicates electrum (gold-silver compound, called soma) and copper could have come principally from Rajasthan. Lead may have come from Rajasthan.

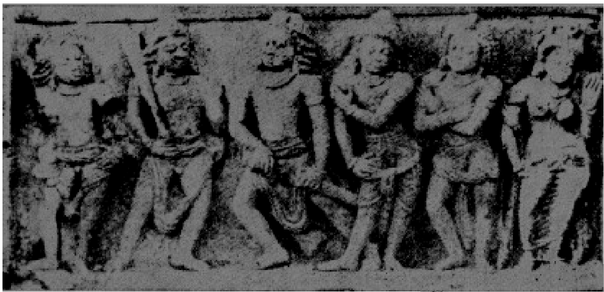
Armed warriors: She, Durga_, mother-goddess

The mother-goddess imagery bursts upon the cultural scene of Bha_rat with extraordinary authenticity in the sculptural tradition of the country. In the context of depicting arms, armour and valour, the reference in ancient texts to the training in weaponry given to women and the depiction of Jaya_ as the mother-goddess of all weapons in the Ra_ma_yan.a gain special significance. It is also notable that Jaya_ was the early name of the great epic, the Maha_bha_rata. The narration in the Ra_ma_yan.a about Jaya_ as daughter of Daks.a will be detailed in another section.



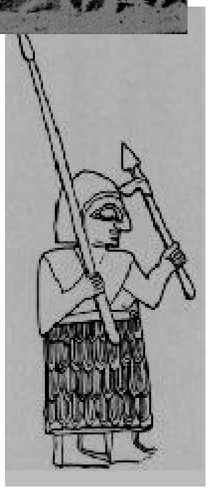
Weapons in ten hands of Mahis.a_suramardini_, Dulmi, Manbhum District, Bengal; Calcutta, Indian Museum.

Celebration of valour



Deogad.h, ancient warriors of Bha_rat with mace and sword; Lower half of the Anantasa_i panel (After Smith, V.A., 1930, *History of Fine Arts in India and Ceylon*, Pl. 49)





Barhut; ancient warrior of Bharat; the sword is suspended from the left shoulder (After Bachhofer, L., 1929, *Early Indian Sculpture*, 2 vols.,Pl. XXII). [No pictograph of a warrior dated to ca. 3000 BC from the



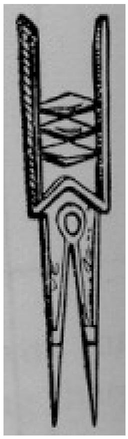
Sarasvati River Basin is available; however, the picture s of warriors in Mesopotamia provide a glimpse of the arms and armour of the warriors of the times].

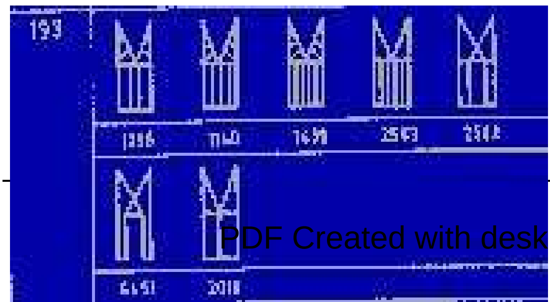
Sumerian warrior, ca. 2500 BC carrying a spear and a battle-axe

A warrior, ca. 2500 B.C. with helmet, battle-axe and sickle-sword; a small plaque of engraved shell from the ancient city of Mari on the Euphrates (Musee National de Louvre, Paris).

Egyptian axes of bronze (After Fig. 89 in: Richard F. Burton, 1884, *The Book of the Sword*, New York, Dover Publications, Inc., p. 89). "The Akhu or war-axe was, as we might expect, known to ancient Egypt in early days, and became an object de luxe. A gold hatchet and several of bronze were found buried as amulets in the coffin of Queen Askhept, the ancestress of the Eighteenth Dynasty. Again, a bronze weapon occurred with a mummied queen of the Seventeenth Dynasty (BC 1750). Useful in war, the implement, probably when in the stone period, rose to be a symbol of the Deity: hence, doubtless, the haches votives of the later Bronze Age without edge to serve for work or weapons, and intended only for religious use….From Egypt the axe passed into the heart of Africa. Here it still serves, before and after use, as a medium of exchange; and this circulation from tribe to tribe explains the various forms that have overspread the Dark Continent. " (pp. 89-90). Kit.a_r or kat.a_ri (After Fig. 149 89 in: Richard F. Burton, 1884, *The Book of the Sword*, New York, Dover Publications, Inc., p. 140). The shape of this 'Hindu kit.a_r' is analogous to a sign and its



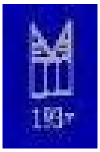




variants found in inscriptions of the civilization.

Sign 193 and variants.

A concordant etymon connotes a buffalo bull. Kat.ra_ bull calf; kat.hr.a_ young buffalo bull; kat.iya_ buffalo heifer (H.); kat.r.a buffalo calf (Wpah.); kat.ai buffalo calf (Gaw.); kat.r.a_ young buffalo (P.)(CDIAL 245). It is possible that the depiction of a buffalo in inscriptions may connote the unique knife called kit.a_, kat.a_r in the tradition of Bha_rat.

Jaya_, the creator of all  **weapons**

Daks.a had two daughters: Jaya_ and Suprabha_. Fifty sons were born to Jaya_ and fifty sons to Suprabha_. The hundred sons bore many kinds of arrows and weapons. (Va_lmi_ki Ra_ma_yan.a Ba_laka_n.d.a, Sarga 21). Another name of Daks.a was 'kan' (MB S'a_nti Parva, Ch. 208, Stanza 7). [kan = copper, copper work (Tamil.lex.)]. In the tradition of Bha_rat, *Jaya_* is the early name of the epic, Maha_bha_rata.

‘Vis’va_mitra is piety incarnate; he is the foremost of those endowed with prowess. He is superior in learning (to all) and is a great repository of ascetism. He knows (the use of) the different types of missiles…All the missiles were (formerly) born as the most pious sons of Kr.s’a_s’va (a lord of created beings) and were gifted (by Lord S’iva) to Vis’va_mitra while he ruled over a kingdom. The aforesaid sons of **Kr.s’a_s’va**, born (as they were) of the daughters of Daks.a (another lord of created beings), were possessed of varied forms, endowed with extraordinary prowess and full of splendour, and brought victory (to him who employed them in his service). Jaya_ and Suprabha_, the two aforesaid daughters of Daks.a, who were (both) possessed of well proportioned limbs, gave birth to a hundred most effulgent missiles as well as (other) weapons – astra_n.i, s’astra_n.i – (Of these) Jaya_, who had secured a boon (to this effect), got fifty excellent sons, possessed of infinite glory and devoid of form, for the destruction of Asuric (diabolic) forces. Suprabha_ too brought forth fifty more sons, (who were) exceptionally powerful, hard to overpower, (nay) difficult (even) to assail, and (collectively) known by the name of Sam.ha_ras (destructive forces).” (Ra_ma_yan.a Ba_laka_n.d.a Sarga 21.10 to 17).

The name, **kr.s’a_s’va** is based on a Vedic tradition of kr.s’a_nuh:

Kr.s’a_nuh (like Balara_ma, a ploughman) was a guardian of the Soma, name of an archer who guards the Soma from gods and men (RV 4.27.3)

Av/ yc! D(e/nae ASv?nI/dœ Ax/ *aerœ iv ydœ yid/ vat? ^/÷> pur<?ixm! ,
s&/jdœ ydœ A?Sma/ Av? h i]/pj! Jya< k«/zanu/rœ ASta/ mn?sa -ur/{yn! .

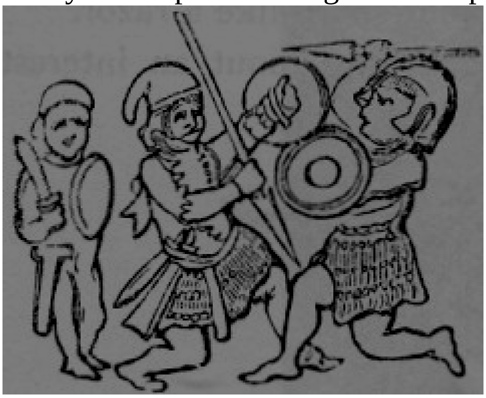
4.027.03 When the hawk screamed (with exultation) on his descent from heaven, and (the guardians of the Soma) perceived that the Soma

was (carried away) by it then, the archer of Kr.s'a_nu, pursuing with the speed of thought, and stringing his bow, let fly an arrow against it.

kars.an.a = hurting, tugging, ploughing (Mn.)(CDIAL 2907). kasan.a = ploughing (Pali); kes.eni = plough (Pas'.) kasn.a_ ploughshare (Or.); kasan.i ring used by archers for protecting fingers, drawing tightly (Or.); kasan = pain, torture (H.)(CDIAL 3445). kisa_n farmer (P.H.)(CDIAL 3447). kasi = agriculture (Pali); kr.s.i = ploughing (RV)(CDIAL 344).

"Jaya_ … became, according to a promise of Brahma, the creator, the mother of all weapons, including missiles. These are divided into four great classes. The Yantramukta (thrown by machines); the Pa_n.imukta (hand-thrown); the Muktasandha_rita (thrown and drawn back) and the Mantramukta (thrown by spells, and numbering six species), form the Mukta or thrown classes of twelve species. This is opposed to the Amukta (unthrown) of twenty species, to the Mukta_mukta (either thrown or not) of ninety-eight varieties, and to the Ba_huyuddha (weapons which the body provides for personal struggles). All are personified…Among the four arts to be studied besides the Ka_mas'a_stra (Ars Amoris), women are, enjoined by the Sage Vatsya (Part I, p.26) to 'practise with the Sword, single-stick, quarter-staff, and bow and arrow'. The Ili (hand-sword, p. 17) is two cubits long and five fingers broad; the front part is curved; there is no hand-guard, and four movements are peculiar to it. The Prasa, or spear, in some works becomes a broadsword. The uterine brother of the Sword is the Pattis'a or two-bladed battle-axe. The Asidhenu (dagger), the 'sister of the Sword and worn by kings', is a three-edged blade, one cubit long, two thumbs broad, without hand-guard, carried in the belt, and used in hand-to-hand conflict. The Maus.t.ika (fist-Sword, stiletto) is only a span long, and thus very handy for all kinds of movements. The sage Vais'ampa_yana, a pandit or pedant lecturing on the Art of War, warns us that the 'Efficiency of the weapon is subject to great changes. In different ages and places the quality of an arm is not the same, for the material and

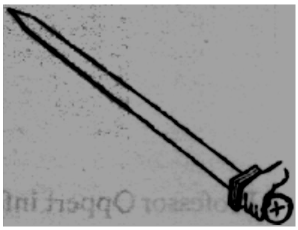
mode of construction greatly vary. Moreover, much depends upon the strength and ability of the person using such weapons, in preserving, increasing, or diminishing their efficiency… The Sword, S'ukra says (Lib. Iv. Sect vii. P. 109, verse 154): is

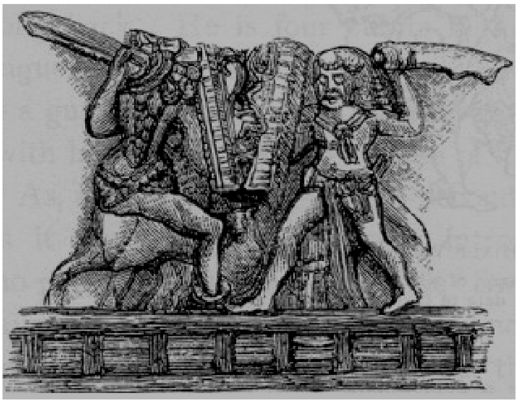


advaktras'caikadha_ro vista_re catura_n:gulah ks.urapra_nto na_bhisamo drahamus.t.issucandraruk khad.gah prasas'caturhastadan.d.abudhnah ks.ura_nanah,

the sword is a little curved and one-bladed; it is four-fingers broad, and sharp-pointed as a razor; it extends up to the navel, has a strong hilt, and is brilliant as the beautiful moon. The Khad.ga (two-handed sword) is four cubits (or six feet) long, broad at the hilt, and at the end-point sharp like a razor.' (Richard F. Burton, 1884, *The Book of the Sword*, New York, Dover Publications, Inc., pp. 213-216).

Hindu warriors. From memorial stones of Bijanagar, date ca. middle ages (After Fig. 233 in: Richard F. Burton, 1884, *The Book of the Sword*, New York, Dover Publications, Inc.)





Battle scene from a cave in Cuttack, 1st cent. AD (After Fig. 235 in: Richard F. Burton, 1884, *The Book of the Sword*, New York, Dover Publications, Inc.)

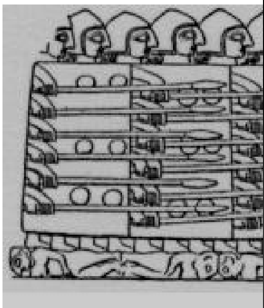
Arjuna's sword. Elephanta caves, northeast balisica. Arjuna holds the sword in his right hand perpendicularly and pointing upwards, a short, straight blade, with a

beveled point and with a small hand guard; the fist fills the grip, the large pommel confines the hand (After Fig. 237 in: Richard F. Burton, 1884, *The Book of the Sword*, New York, Dover Publications, Inc.)



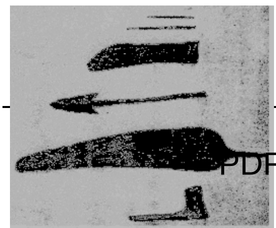
Phalanx of Sumerian soldiers armed with copper-tipped spears; drawn from the relief on a stele from Tello, Mesopotamia, 3rd. millennium BC.

Tello. Relief on a stele. Warfare in Mesolpotamia; phalanx of soldiers wearing helmets, carrying spears and shields. (Baghdad)





The civilization had an extensive interaction area, the interaction being principally governed by (1) the availability of metals and minerals and (2) the markets for finished products of metal weapons and tools. There were 'rathaka_ras' who made carts with solid wheels and the inscriptions depict spoked-wheels. The models of toycarts found at Banawali and the copper model frame of a chariot found at Chanhudaro, indicate



that the workers of the civilization had the metal tools needed to make the wheels, carts and battle-cars. It is likely that many battle-cars were drawn by onagers or horses. Evidence for horse comes from Surkotada in the Rann of Kutch.

Sumer; Top to bottom: two bronze drills, a copper axehead, a copper spearhead, a copper saw blade and a bronze adzehead. (From S.N.Kramer, 1957, opcit., p. 155).

In the second panel of the Sumerian plaque, a fox is shown with a dagger fixed to its belt on the waist, followed by a lion. The third panel
shows a one-horned bull and a bear. The fourth panel shows a scorpion-man and an antelope. The top panel shows a hero battling two bull-men. The pictorials are apparently homonyms for weapons.



Mohenjodaro: carved sandstone; braided and combed hair tied into a double bun on the back of the head; a plain fillet or headband with two hanging ribbons falling down at the back. Shaven upper lip; stylized almond-shaped eyes; 13.5 cm. High; DK-B 1057 Mohenjodaro Museum;(After Dales 1985, pl. Iib; Ardeleanu-Jansen, 1984, 139-157).

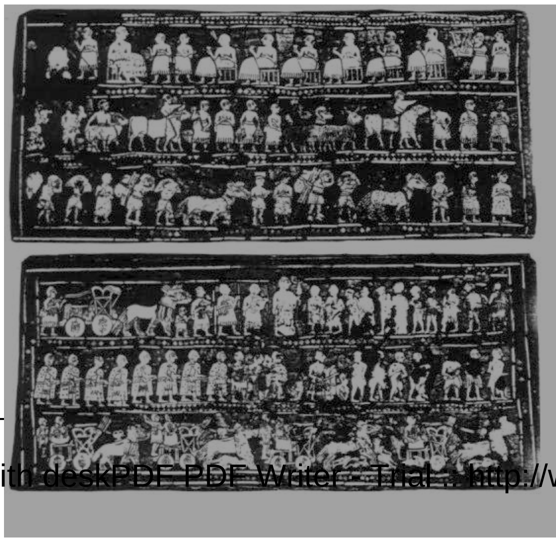
Warfare in Ancient Sumer

Copper tools predominate in Sumer by Ur III period (2380-2360 B.C.) In Sumer, the early urban civilization of southern Mesopotamia, kings used writing to record and commemorate significant military victories.

The standardized equipment of bodyguards were: a copper helmet, battle-axe, the dagger and a heavy spear. The early spearheads had long tangs, which were thrust into the spearshaft. A hook was formed at the end of the tang to firm up the attachment to the shaft. The blade of a Mesopotamian battle-axe was round, designed to pierce helmets and skulls and slash gaping flesh-wounds.

"Mari on the Euphrates... The palace administration was responsible for the provision of arms, munitions, and siege equipment. King Zimri-Lim wrote while on a military campaign to order further supplies of arrowheads: 'To Mukannishum [his official in the palace] say this, Thou speaks your lord. When you hear this letter read, have made: 50 arrowheads of 5 shekels [40 grams] weight in bronze, 50 arrowheads of 3 shekels, 100 arrowheads of 2 shekels, 200 arrowheads of 1 shekels. Give orders to have this done at once. Then have them put in store to await my further instructions. I suspect the siege of Andariq will be prolonged. I shall write to you again about these arrowheads. When I do write, have them brought to me as quickly as possible.' Anothe letter from the king to the same official orders him: 'When you hear my letter read to you, have made 1,000 bronze arrowheads at 1/4 shekels [2 grams] each. Have them made from the red bronze at your disposal, and have them sent to me at once.'.. Later, when Shamshi-Adas's son Yasmah-Addu was installed as vice-regent at Mari... in a letter to his son, Shamshi-Adad ordered 10,000 arrowheads to be made, requiring almost five tons of bronze. Some of the bronze for the job had to be transported from Assur since the Mari palace armourers did not have enough stock. The accounts were kept straight   Watkins, 1989, The Beginnings of Warfare, in: General Sir John Hackett (ed.), *Warfare in the Ancient World*, London, Sidgwick and Jackson Ltd.)

The 'Ur royal standard'depicts 'fish' motif among the booty brought in by the troops:



The so-called 'royal standard' from a tomb at Ur: a mosaic of shell figures on a background of lapis-lazuli; height 20 cm. The object is perhaps the sounding-box of a musical instrument.

Side 1: victory celebration; the vanquished bring tribute, wild asses, bales of goods, meat and fish; the king wears his sheepskin shirt and sits on his throne; scenes of drinking and rejoicing; agricultural activity.[Note the one-horned bull and ibex]

Side 2: top register shows prisoners being led before the king; some are naked, others wear kilts with a zig-zag hemline; the king stands on the ground, towering above the others (**primus inter pares**); **top**: infantry soldiers wearing helmets and stiff cloaks march to war with spears and battle-axes; **bottom**: a row of four war chariots going into battle; a leading chariot has its wheels rolling over bodies of fallen enemy soldiers; the charioteer and men with light spears ready to hand in quivers.

Evolution of the ratha, chariot

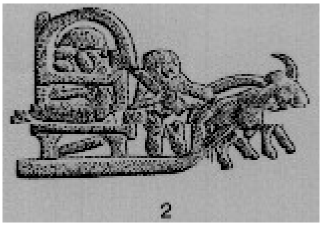
"It is believed that the invention of the wheel and its application to carrying loads by wagon instead of by sled took place in Sumer during the Uruk period. The construction of wagons was improved in the Early Dynastic period (ca. 2900-2350 BC). The solid wheel was replaced by a spoked one, which revolved on the axle instead of along with it. The Vulture Stela of Eannatum (ca. 2450) of Lagash (modern Tell al-Hiba) depicts the use of a four-wheeled wagon as a battle vehicle." (Michael C. Astour, '995, 'Overland trade routes in Ancient Western Asia', in: Jack M. Sasson ed., *Civilizations of the Ancient Near East*, New York, Charles Scriber's Sons, p. 1402).

> "Chariots. In the Near East the chariot was a light, open vehicle with two spoked wheels, drawn by horses yoked on either side of a draught pole. It was used primarily in warfare, but also in hunting and processions. The first known examples with these features appear in Anatolian glyptics of the early second millennium BCE, followed by those depicted on Syrian seals of the eighteenth and seventeenth centuries BCE. In Mesopotamia the chariot had been preceded by disk-wheeled vehicles with both two and four

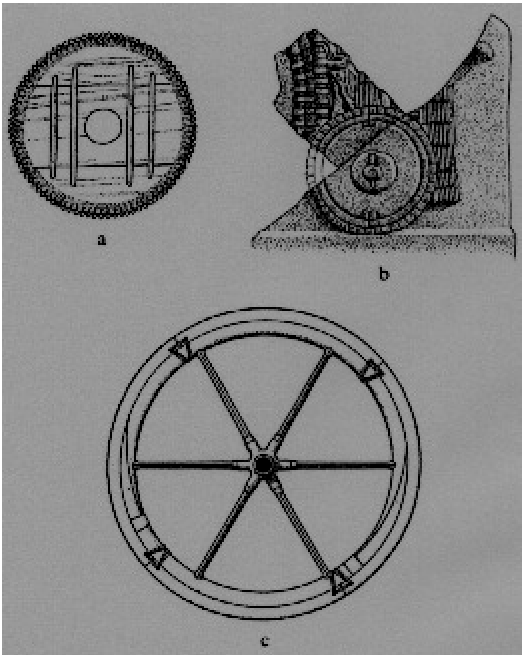
> wheels, pulled by asses or ass/hemione orass/horse crosses. Five innovations gave the true chariot its superiority: thee spoked wheel; the exclusive use of horse draft (with an adaptation of the yoke for this purpose); the replacement of the old nose-ring control by a proper horse bit; the use of the bow as a primary chariot weapon; and proportions permitting a crew of two to stand abreast." (J.H.Crouwel and Mary Aiken Littauer, 'Chariots' in: Jack M. Sasson ed., *Civilizations of the Ancient Near East*, New York, Charles Scriber's Sons, pp. 485-487).

Much has been written about the origin of wheeled vehicles, the so-called 'sledge' and the 'travois/slide-car', with the sledge being considered ancestral to the four-wheeler and the travois-slide car ancestral to the two-wheeler... there is no evidence to connect the slide-car at all with any of the earliest known wheeled vehicles--either four-wheelers or two-wheelers. These are first attested in earlier 3rd millennium BC Mesopotamia by figured documents and actual remains, preceded in the 4th millennium by pictographic signs showing sledges and sledges on two rollers or (more likely) alreadyh four wheels, which point clearly to a sledge-with-roller origin. There is no evidence of any travois/slide-car in this region and the geographically closest document is only in the 2nd millennium Transcaucasia. (pp.1-2)...

...the triangular, A-frame cart sometimes adduced asevidence of the derivation of the original two-wheeler from a triangular travoic/slide-car to which rollers have been added... Although its wide diffusion today (from the Iberian peninsula to India) has been taken as proof ofits great antiquity, it is noteworthy that the A-frame is nowhere attested among the numerous early two-wheelers from Mesopotamia and the Levant, all of which display the single central draught pole, nor is it found among those of the Indus civilization, which show Mesopotamian derivation. (p.10)... Childe postulated that the composite disk wheel was too complex a construction to have originated in more than one area. (Childe 1951, 193). He supported his contention that this area was Mesopotamia by a chronological chart of diffusion that has not, in its basic lines, been refuted. This



type of wheel was also accompanied by paired draught. It is indeed Mesopotamia that has yielded evidence for the first development of wheeled vehicles, in which platforms and sledges, rollers, and ploughs pulled by paired cattle must all have played a role, but not the travoic/slide car (pp. 10-11)... Stone plaque. London,BM 128858 (after museum photograph).The first evidence for the use of wheeled vehicles comes fromthe site of Uruk in southern Mesopotamia. It consists of simple pictographic signs on inscribed clay tablets found in Uruk level IVa (ca 3200-3100 BC). The signs represent sledges with runners in front, as well as similar sledges raised over what may be either two (captive) rollers or four disk wheels (fig.1)...These earliest vehicles are always shown with a roofed superstructure. That the latter may represent a covered litter is suggested by a very small unprovenanced steatite plaque of the same period, which shows an important personnage (or, conceivably, an effigy of a deity) seated in a litter with an arched tilt, the legs of which are set on such a sledge (fig.2)...The sledge on the steatite plaque is drawn by one or two bovids... equid draught begins only in the earlier 3rd millennium BC....The pictographs, taken together with the plaque, suggest that sledges, with and without rollers or wheels, were used to convey important people or effigies of deities in litters or even merely under a tilt. This, of course, does not mean that they may not also have been used simply as flat cars for the transport of bulky or heavy material over reasonably smooth terrain. (pp.13, 14).



WHEEL. Figure 1. *Wheel types.* (a) reconstruction of a wheel type from graves in Kish, Ur, and Susa, mid-third millennium BCE; (b) depiction of a wheel on a stela of Gudea, late third millennium BCE; (c) drawing of a six-spoked wheel surviving from eighteenth-dynasty Egypt. (After Littauer and Crouwel, 1979)

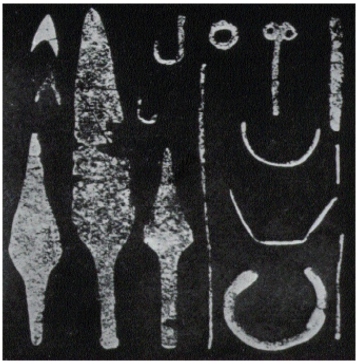
"Wheel. Archaeological evidence for the wheel appears in the Near East as early as the Early Dynastic II period (ca. 2750-2650 BCE). Earlier pictographs from Uruk level IVa (ca. 3100 BCE) show sledges raised over what are either two captive rollers or four disk wheels. Remains of actual wheels were found at Kish, Ur (Early Dynastic III), and Susa (figure 1a) in the mid-third millennium. These were all tripartite: made of three planks vertically from a tree trunk and held together by external battens as well as by rawhide, with wooden or metal tires (from 0.50 to 0.83 m in diameter) that wre sometimes hobnailed...The wheels appear to revolve on fixed axles. A variation of this wheel first appears on a stela of Gudea in the Ur III period (figure 1b), in the late third millennium. It shows what seems to be a relatively small solid wheel rimmed by two metal half tires with hobnail tread, secured by clamps at their ends. Actual metal tires in six or seven segments, with a clamp at either end and one in the middle, indicate disk wheels with diameters of 0.67-0.97 m. These come from early second-millennium Susa, Assur, and elsewhere. Of lasting significance were attempts to lighten the disk

wheels, as first seen on a third-millennium seal from Hissar IIIB (figure 2). On it, the central plank, through which the axle passes, is narrowed to a diametral bar; the flanking planks of the tripartite wheel are eliminated, and the former bonding slats are turned into sturdy transverse bars between the diametral bar and the felloe. This crossbar wheel is also clearly illustrated in the second millennium BCE, fixed on a revolving axle; it has remained in use with simple carts in various parts of the world. By far the most important innovation was the spoked wheel, which first appeared with four to eight spokes, in Anatolian and Syrian glyptics and other graphic remains from the early second millennium BCE. Actual four- and six-spoked wheels (figure 1c) survive from eighteenth-dynasty Egypt. These have composite spokes made from single rods, half oval in section, and heat bent in the middle to form an angle (of 60 degrees for a six-spoked wheel and 90 degrees for a four-spoked one)...Third millennium representations in Mesopotamia show disk-wheeled vehicles in military, hunting, cult, and travel contexts only. Evidence for their use in warfare, for which they were clearly unsuitable, fades rapidly after the middleof the millennium. That wheeled vehicles were considered prestigious is clear from their burial in richly furnished graves (Kish, Ur, Susa)...The appearance, in about 2000 BCE of the spoked wheel and horse draft -- both essential for true chariot -- did not produce a suitable military vehicle immediately: the team's harness and its control had to be improved first. Evidence for this apperas initially on early Syrian seals of the eighteenth century BCE." (J.H. Crouwel and Mary Aiken Littauer, 'Wheel', in: Jack M. Sasson ed., *Civilizations of the Ancient Near East*, New York, Charles Scriber's Sons, pp. 343-344). Source for Mesopotamian and Egyptian evidence: M.A. Littauer and J.H. Crouwel, 1979, *Wheeled Vehicles and Ridden Animals in the Ancient Near East*, Leidenj, E.J. Brill

"To the doubt whether the Harappa_ Culture had sufficiently sophisticated metal tools for the manufacture of the spoked wheel, the answer is unequivocal. The impression of primitiveness produced by some Harappa_n weapons needs to be emphatically qualified. A.L. Basham writes: 'In one respect the Harappa_ people were technically in advance of their contemporaries -- they had devised a saw with undulating teeth, which allowed the dust to escape freely from the cut, and much simplified the carpenter's task. From this we may assume that they had particular skill in carpentry'. (A.L. Basham, 1961, **The Wonder that was India**, New York, Grove Press Inc., p. 21). Then there is the twisted copper or bronze drill discovered by Rao at Lothal. Sankalia records the find and comments: 'Its occurrence at so early a date is of great moment in the history of civilization.' (Sankalia, H.D., 1962, **Indian Archaeology Today**, Asia, Bombay, p. 61)...

"This point about the state of metallurgy is important, as it keeps the Harappa_n wheel-representation distinct from a certain solitary exception, which is still earlier, tentatively dated to about 4000 BC. Piggott has discussed the Tell Halaf painted pot where a human figure stands by a circular object divided by cross-lines. Piggott finds it difficult to accept the representation as that of a wheeled vehicle because the metallurgy of Tell Halaf times is known to have been hesitant and experimental, not at all equipped with tools of a standard demanded for the production of a spoked wheel. (**Prehistoric India**, p. 200). Besides, there is no supporting evidence for any sort of wheeled vehicle in c. 4000 BC. According to Gordon Childe, the earliest vehicles in history, date to a little before 3500 BC. (Gordon Childe, 1951, 'The First Wagons and Carts from the Tigris to the Severn', **Proceedings of the Prehistoric Society**, 17(3), pp. 177-94). And they are without the least trace of sp;okes. Even as late as the Royal Tombs of Ur (c. 2500 BC) the Mesopotamian wheels are solid...

"And when we learn from Macdonell and Keith that in the RIgvedic chariot 'sometimes a solid wheel was used' (**The Vedic Index**, II, p. 201), we get a link



between India's oldest scripture and the clay-model carts and chariots of the Indus Valley Civilization, in addition to a link between it and that civilization's wheel-figures on stamp-seals, weapons and potsherds. Thus a Rigveda prior to 2500 BC can account for all we know of Harappa_n wheels...

"Spokes were adopted at different times by different peoples and countries. O. Schrader has expressly pointed out agreement in the names of the following portions of the wagon in the Indo-European languages: wheel, axle, nave, linch-pin, pole and yoke. The agreement is set over against the near-disagreement about the felloe (the outer rim attached to the spokes) and the total disagreement about the spokes. (1890, **Prehistoric Antiquities of the Aryan People**, translated by Frank Byron Jevfons, London, Charles Griffin and Co.; 1972, repr. Oxford Publishers, Delhi, p. 339). Schrader, referring to the terms in common, notes: 'In this collection, it will be observed, there is no equation for the spoke of the wheel'. Thus it is not unnatural for both the Rigveda and Harappa_ Culture to have the spoked wheel exclusively in their respective epochs -- with nothing like it in the rest of the world.

"Not only is it unnecessary to date the Rigveda after the Harappa_ Culture in the context of the wheel with spokes. It is also more in the fitness of things to regard it as pre-Harappa_n in that context."

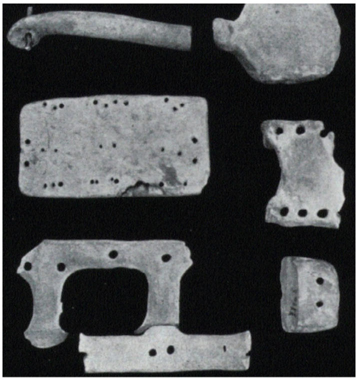


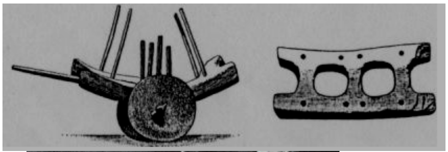
(K.D. Sethna, 1992, **The Problems of Aryan Origins: From an Indian Point of View**, Second Extensively enlarged edition with five supplements, Delhi, Aditya Prakashan, pp. 48-55).

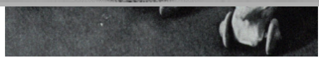


Banawali. Copper tools. (After R.S. Bisht, 1982, Excavations at Banawali, 1974-77, in: Gregory L. Possehl, *Harappan Civilization*, Delhi, Oxford and IBH, p. 119, Pl. 10.25, 10.26).

Banawali. Terracotta toy carts, cart frames and platforms.. (After R.S. Bisht, 1982, Excavations at Banawali, 1974-77, in: Gregory L. Possehl, *Harappan Civilization*, Delhi, Oxford and IBH, p. 119, Pl. 10.23, 10.24).



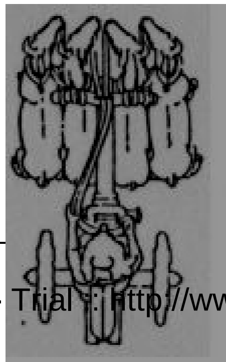




Clay model of a cart (pole, posts and axle reconstructed), with a top view of the chassis, Chanhudaro, Sarasvati-Sindhu valley, ca. 2,000 BC. The axle turns with the solid, non-spoked wheels. Carts in contemporary Mesopotamia also did not use spoked wheels.

Copper/bronze model of a passenger box on a cart, Chanhudaro, ca. 2,000 BC. Cart is shown with roof and side panels; a short ledge in front served as a seat for the driver. (Chanhudaro: 2291; Boston, Museum of Fine Arts: MFA 36.2237; Mackay, 1943, pl. LVIII.2).



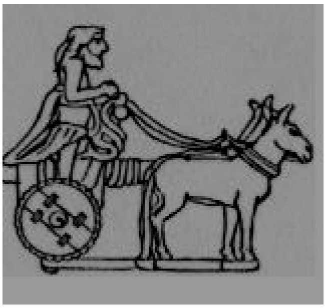


Harappa chariot-box, referred to as **ekka_** by Mackay (Fig. 35, Pl. CXXV, Vats, *Excavations at H*arappa) Notation one: Chapter II Page 99 *Excavations at Harappa*, Madho Sarup Vats "...A very important and interesting object found in the southern portion is an

extremely delicate miniature of a two wheeled copper chariot (No. 355 pl. CXXV #35) Which has been pieced together from numerous fragments recovered at a depth of 10 feet 6 inches below the surface in square M12/13. The Chariot is open both front and back, and has a gabled roof, which, like the side walls, is relieved with simple linear decoration. The driver is seated in front on a raised seat, but the animal supposed to be yoked to the chariot, the poles, the wheels, and the axle are all missing. The chariot is very small--no more than two inches in height, and the details--particularly the face of the driver--very obscure... as an instance of a covered chariot (1a) this is the first example from the Indus Valley Sites, antedating the earliest use of a wheeled vehicle in Egypt by several centuries. The various examples of war chariots on the mosaic standard at Ur (1b) (cir. 3500bc) are all four wheeled and without a roof, nor is there any roof on the somewhat carefully modelled terra cotta chariot of Ishtar with a high dashboard from Emete Ursag..."

This clearly had two-wheels, similar to the two-wheeled battle-cars.

[Copper model of a chariot with four onagers harnessed abreast, from Tell Agrab, Mesopotamia; 3rd. millennium BC; the stand has been removed in the top view presented on the left.] "Another four-wheeled cart (No. 4686) with the same shield-like canopy, unearthed at Chanhu-daro, seems like No. 9 in Pl. LVIII (see below) to havehad wheels of larger diameter in front than behind, a very unusual feature in the ancient toy vehicles of any country. As we know that the people of the Harappa culture were well acquainted with the Sumerians, it is not surprising



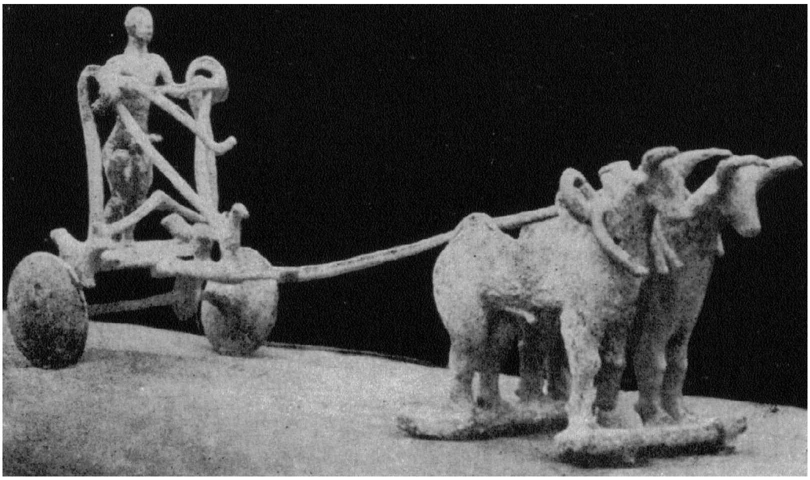
that both two-wheeled and four-wheeled vehicles were in use in both countries, but where the wheeled cart was originally invented it is not so easy to say. From the model carts and chariots found at Sumerian sites and their representations in relief and mosaic, we can say that the type of chariot used in Sumer was definitely less primitive than anything yet found in ancient India...We were fortunate in finding two toy carts made of metal, presumably bronze, not copper, in place of the usual

pottery. The first (LVIII, 1,1) is only 2.93 inches long, 1.2 inches wide, and 1.75 inches high, and is nearly perfect, save that the front of the cart (facing right in No.1), which was originally in the same line as the rest, had been bent upwards. There are also fragments missing from the rear of the cart. Its frame resembles No. 21 in Pl. LVIII, save for having six cross-bars instead of three...The other metal vehicle found (Pl. LVIII,2) is of quite a different pattern; in some respects it resembles the 'ekka' of modern India. Its present height is 2.4 inches, its length 1.71 inches and width 1.1 inches...Each side has crossed struts between supports at each end for a pent-roof...An almost similar toy was found by Mr. MS Vats at Harappa some years ago (ARASI 1926-27, pl. XXIII, fig. d, p. 105). It also has a canopy and sides strengthened by cross-members set on an open frame; indeed, it differs from the Chanhu-daro vehicle only in having a driver, very like the little figure seen in Pl. LVIII,1. The distance of Harappa from Chanhu-daro is well over 400 miles, and the close resemblance between model carts found in these cities so widely separated argues a wide-spread and homogeneous culture in those days...Wheels. The pottery wheels of the toy carts were of three main types. Nos. 3, 20 in Pl. LVIII show the most common form, with a pronounced hub on one side, which was either roughly moulded with the fingers or finished off with a sharp instrument to obtain a better shape. In another type (Pl. LVIII,23) the hub is not emphasized, both sides of the wheel being markedly convex. In the third type (Pl. LVIII, 24,25), the wheel is plane on both sides and frequently covered with a thick deposit of sand and mica, showing that these objects had been shaped or laid to dry on a sand bed...The three ram chariots (Pl. LVIII, 11,12,15) are typical of many that have been found at Chanhudaro, but nearly always mutilated...We now have definite evidence in a painted model wheel from Chanhudaro (Pl. LVIII, 20) that the wheels used there were...made of three solid pieces of wood securely fastened together...a fourth type of toy cart or chariot frame is shown in Pl. LVIII, 9,13...(Mackay, 1943, pp.156-166).

In Mesopotamia, the under-carriage consisted (to judge from those of the hearses foundat Kish and Ur) of a single plank, 45 to 56 cm. wide, perhaps attached to the axle-tree by straps; perhaps, the axle turned with the wheels. In the case of four-

wheeled wagons there is no evidence at all that the front axle was an independent pivoted bogie. Sumerians employed the onager (***Equus onager*** Pallas), yoked in the manner of oxen to draw war chariots and passenger vehicles. Note the quiver with spears carried on the wagon and vanquished soldier crushed under the onagers. "It is most unlikely that horses were first domesticated or yoked to chariots in Mesopotamia, for the wild equid to be expected in that area was the onager, which had in fact been tamed there by 3000 BC. It is true that a single pictographic tablet of about that date contains the sign, compounded of 'ass' and 'mountain', that a thousand years later was to be regular cuneiform ideogram for 'horse'... Wild horses (***Equus caballus***)--essentially steppe dwellers-- have existed in northern Eurasia... The earliest convincing representations of equids drawing cars with spoked wheels occur on cylinder-seals from Hissar in north-east Persia (2000+-200 BC) and from Cappadocia (1950-1850 BC). There are written references to horse-breeding at Chagar Bazar on the Khabur by 1800 BC..." (V.Gordon Childe, 1954, Wheeled Vehicles, in: Singer et al, opcit, pp. 718ff.)

Daimabad. Bronze chariot. (Aftter S.A. Sali, 1984, Late Harappan Settlement at Daimabad, in: BB Lal and SP Gupta, eds., Frontiers of the Indus Civilization, Books and Books, Delhi, Plate 94] “The chance discovery in a pit under a tree by a villager in 1974 of four



solid bronzes – an elephant, a rhinoceros, a buffalo and a chariot – displayed sophisticated metallurgy…Period I (1900 to 1700 BC)… Painted designs constituted of vertical wavy lines drawn in groups, cross hatched bands and ladders and an antelope. These designs suggested, according to Rao, contacts with the late Harappans who had by now moved to the Tapi and Godavari valleys." (p. 238). The chariot has two birds facing opposite directions perched on the frame of the chariot where the charioteer stands; a dog is located on the horizontal strut which links to the yoke of the two oxen; the chariot has two solid wheels.

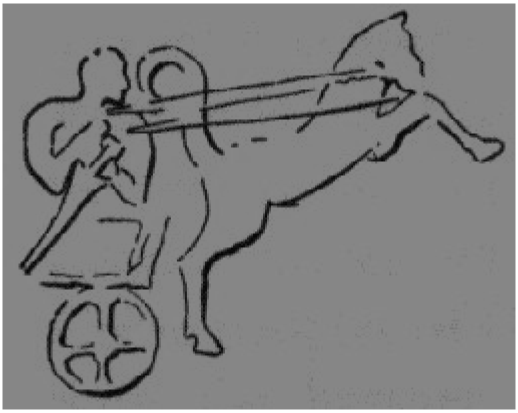
> "The exact find spot (of the bronze models) was examined by S.R. Rao (1978: 62) who confirmed that the bronzes belonged to the Late Harappan phase (ca. 2000-1800 BC). The calibrated dates would be ca. 2200-2000 BC which would place it in the Late Mature Harappan phase. The next problem relates to the authorship of the bronzes. DP Agrawal (1978: 45) has questioned their antiquity on the basis of the presence of arsenic which, according to him, is absent in artifacts from chalcolithic sites in the Deccan...It has been observed that 'The hardness of most of the copper objects found at Harappa has been shown on analysis to be due to a high arsenic content. The presence of this arsenic is believed to be accidental, being indigenous to the copper deposits from which the ores were extracted rather than secondarily introduced' (Coghlan 1951: 44-45). Lamberg-Karlovsky (1967: 151) therefore rightly argues that 'We must not disregard the possibility, however, that the smiths recognised the advantages of an ore with arsenic in it for producing a harder, less brittle tool'. In the light of evidence of Harappan artifacts, we are of the opinion that the Daimabad bronzes may originally have been Harappan, that is, from Harappa proper, and that they were probably imported into the Deccan. Arsenical alloying is also most significant in the Copper Hoards from the Ganga-Yamuna doab (Agrawal et al 1978)..." (p. 168)

Daimabad chariot is an import from Harappa

Kosambi explains the chariot model: ""Dholavira is a purely halcolithic site which, as the excavations show, was first occupied around 2200 BC and was finally deserted by 1000 BC after which it was never reoccupied. Hence the artifacts from the site can be safely placed between circa 2200 BC - 1000 BC (uncalibrated)...The bull chariot is the most remarkable piece in the hoard. Its total length is 45 cm and the breadth is 16 cm. The complete bronze consists of an elaborate chariot yoked with two bulls and driven by a man in it. It has two solid wheels having a projecting hub on the inner side in which the axle is fixed in such a way that it moves along with the wheels. It looks more like a Roman biga than a cart and justifies its classificatin as a chariot. It has a front guard consisting of two vertical curved bars with turned upper ends, whereas the lower ends are attached to a horizontal bar which, in its turn, has two ring loops for the axle. The guard also has two horizontal bars fixed to it. Of these, the upper one is straight while the lower one is angular. The guard is further strengthened by two oblique bars soldered together in a dog standing on the central pole just in front of the guard. The platform on which rises the guard has on its either side a pair of birds formed into one by merging bodies, but having their heads in opposite directions. Stylistically they are related to the terracotta bord whistles from Harappan sites. The man (ht. 16 cm) driving the chariot is seen standing on the platform. His left hand rests over the front guard and in the right hand is a curved stick. The man is portrayed realistically. His physiognomy indicates that he is probably a Proto-Austroloid. To a great extent, he resembles, stylistically, the terracotta head of a man from Kalibangan which, according to BB Lal, resembles the head of the famous limestone priest from Mohenjodaro (Lal 1979: 89, pl. XXIV). He has a broad, snubbed nose with wide nostrils; his lower lip is thick and protruding. His curly hari, indicated by incised lines, is parted in the middle and is gathered at the back in an elongaged role. He does not appear to be wearing any lower garment but a vertical projection of the abdomen, looking like a hooded cobra, must been part of the lower garment. The chariot has an inordinately long central pole, 32 cm. long. The bulls are not fixed to the yoking pole and can be removed whenever required. It may be noted that the modern cart in Sind also has an inordinately long pole, but a high bent pole seems to be a peculiarity of Sumerian chariots (Mackay 1929: 28,

fig. 1 and 2). The pair of bulls hoked to the chariot are extremely interesting in as much as the modelling of their hind part has lent them the appearance of a horse rather than that of a bull, and their tails look more like a horse's tail. And what is more, their mouth too resembles that of a horse. This bull-horse combination of the body is strikingly similar to that of the unicorn which is so commonly depicted on Indus seals. It is equally noteworthy that a unicorn with two horns has been carved on a seal from Kalibangan (Lal 1979: 91). The most remarkable feature of these bulls is their projecting horns. This is a feature which is characteristic of the terracotta bulls from Chanhu-daro excavations and we are told that they are even today seen in Sind (Mackay 1943: 164, Pl. LVIII, 1 and 1a). Such bulls, however, are not represented in the chalcolithic art of the Deccan.

"It will thus be clear that the chariot is characterised by many Harappan features. It should, however, be made clear that such an elaborate vehicle has so far not been

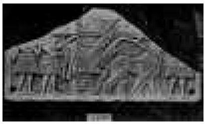


reported from any Harappan site and what we have are only a few toy cart models of copper (Piggott 1970). But they too share some elements in common with the Daimabad chariot. They all have projecting ring loops through whch the axle was passed. The most noteworthy feature of the axle is that it is fixed to the wheels in such a way that it moved along with them. The same feature is also to be noticed in the case of the Daimabad chariot. About the toy carts, presumably of bronze, from Chanhu-daro, Mackay (1943: 164) reports that, 'The wheels are now immovable, but they must originally have revolved in two axle-brackets cast in one with the frame'. This possibly facilitated the dismantling of the vehicle because the chassis could just be lifted off the axle as they do today in Sindh (Mackay 1929: 26-28). It is pertinent to quote Childe in this connection who observed that 'Sumerian and other early vehicles were probably just as easily taken

to pieces, and this point must be remembered in considering the possibility of using them for long distance transport' (Childe 1951: 183). This could be possible because of the manner in which the axle was fixed to the wheels. This mechanism, we are told actually marks an early stage in the evolution of wheeled vehicles (Singer et al 1956: 72). And even in the village carts of modern Sind, which 'Preserve the main outline of the ancient Harappan vehicles, the wheels turn in one piece with the axle as do those of many other recent carts with solid wheels.' (Mackay 1929). This can thus be said to be a distinguishing feature of Harappan vehicles and the same is to be seen the Daimabad chariot."(pp. 163-165).

“It is not easy to reconstruct a war-chariot such as was used in the Greek Bronze Age from the few highly stylized and archaic representations which have survived. Bronze Age chariots from Egyptian tombs of the 15th century BC provide an analogy… On the Egyptian chariots (15th cent. BC), the pole was extended backward under the car as far as the axle to ensure maximum solidarity, but ideograms of Cretan tablets of the 14th cent. BC suggest that Bronze Age chariots were sometimes strengthened by a horizontal strut projecting from the rim of the car and linking with the pole above the yoke.” John Warry, 1980, *Warfare in the Classical World*, Norman, University of Oklahoma Press, p.15). It is notable that the Daimabad chariot is identical to this Cretan ideogram of a chariot strut linking the yoke.

Mycenaen tombstone. Chariot. “…Egypt was overrun and occupied by the ‘Hyksos’ Asiatics for a couple of hundred years or so, between about 1750 and 1580 BC. These invaders were Indo-Europeans, using chariots. Soon after the vigorous rulers of Thebes had thrown the Hyksos out of the Delta in about 1580 BC we find the Egyptian armies well equipped with chariots themselves… …Everyone is familiar with the Egyptian chariot, which appears so prominently and so often in the reliefs on the walls of temples and tombs; the Cretan and Mycenean chariots are less well known, though there are plenty of representations of them in Minoan-Mycenean art (fig. 1)… for more thant 1,000 years the aristocratic charioteer was the arbiter of battle all over the world.” (Ewart



Oakeshott, 1960, *The archaeology of weapons*, Woodbridge, UK, The Boydell Press, p. 22 and fig.1).

Chariot, cart: ratha, s'akat.a

Bas-relief showing chariot, Ur ([V. Gordon Childe, 1929, **The Most Ancient East: the oriental prelude to European prehistory**, London, Kegan Paul, Trench, Trubner and Co. Ltd., Plate XVIII, a.) Note: the wheels of the chariot are 'made of solid pieces of wood, leather-tired and turning in one piece with the axle' ([V. Gordon Childe, 1929, **The Most Ancient East: the oriental prelude to European prehistory**, London, Kegan Paul, Trench, Trubner and Co. Ltd., p. 174].



'Ratha' carrying Prince Siddhartha as he becomes aware of the pain and suffering of the majority of humanity. Gandhara style relief, 2nd cent. AD. Victoria and Albert Museum, London. This has been shown to underscore the continuity of the 'ratha' tradition among the 'royalty' across millennia, a theme elaborated further in the table of concordant pictorial motifs.

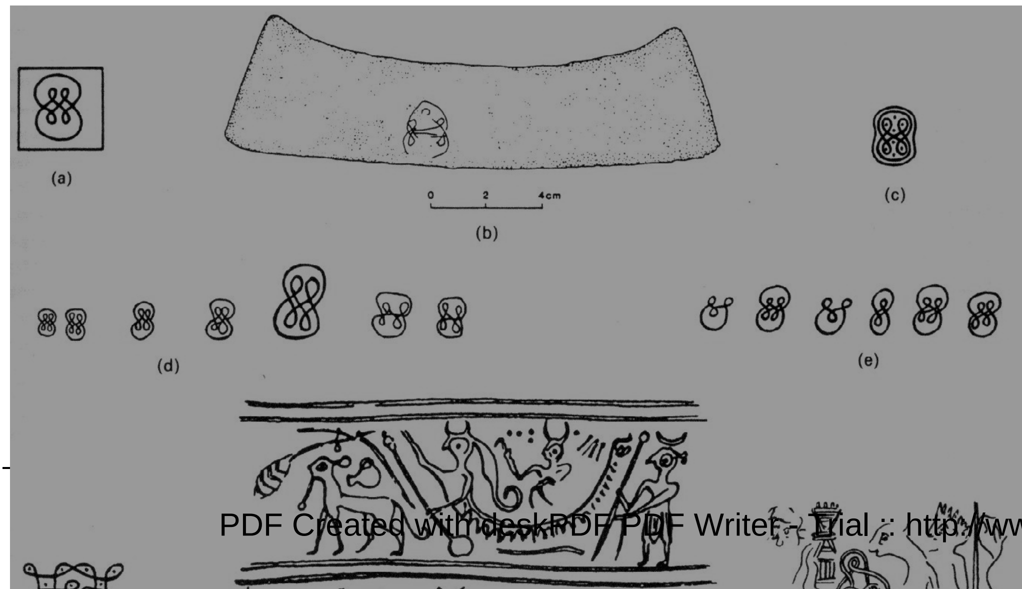
Ratha and the 'endless knot' pictograph

The following series of pictorial motifs is a demonstration of

(1) the continuity of the motif of endless knot in the Indian civilization from ca. 3rd millennium BC upto the 17th cent. AD.and even today, in South India; and

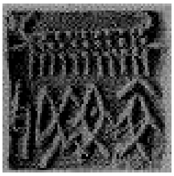
(2) the parallel use of the motif of the endless knot in Mesopotamian civilization ca. 3rd millennium BC.

Endless knot. (a) Mohenjo-daro copper tablet, one side (M-507). Late 3rd millennium BC. 2.8 X 2.8 X 0.3 cm. (b) Rojdi, Gujarat. Axe-head or knife of copper, early 2nd millennium BC. 17.4 cm. long. After Possehl and Raval 1989: 162, fig. 77. [The depiction of an endless-knot on a weapon is a vivid concordance attesting to the association of this motif with words related to battle or armed conflict]. (c) Taxila. Terracotta stamp seal. Early 1st cent. AD. (d) Inscriptions from Gujarat, ra_s.t.raku_t.a, 9th cent. AD. (e) Mughal buildings, 7th cent. AD. Mason's marks. After Sarkar and Pande 1969-70; cf. Gorham s.a.; Heras 1953: li.(f) A typical drawing called ko_lam drawn in South India in front of every house. (g) Sumerian cylinder seal impression (ca. 2500 BC). After Amiet 1980a: pl. 108, no. 1435. The endless-knot appears over the onager drawing the warrior's chariot. The top register of this seal impression depicts a horned-person rowing a boat; another horned-person seated on the boat seems to be carrying a sickle; the boat is led by a one-horned young bull endless knot. After Amiet 1980a: pl. 83, no. 1099 From: Asko Parpola, 1994, Fig. 4.6, p. 57.



granthi, endless knot; krandas, army, battle-cry (associated with war chariot)

granthi = knot (RV. 9.97.18); ga_n.t.ha (H.); granthin = twined together (RV 10.95.6); granth = to tie together (Vedic lex.)



L-051a Seal. **granthi** = honey-comb (Pa_n. 4.3.116, Va_rtt.); cf. Nir. 1.20; granthi = knot of a cord, knot tied in the end of a garment for keeping money (Pan~cat.); a knot tied closely and therefore difficult to be undone, difficulty, doubt (Ch.Up.); granthila = knotted, knotty; grath = to be crooked (Dha_tup. 2.35); granthi = crookedness (Skt.lex.)

gan.t.lu (pl.), gan.t.i = hole bored in ears for ear-rings (Te.lex.)

brahma granthi = a sort of knot holding together the ends of dwija's sacred thread; gan.t.u = a knot (Te.lex.) grathana_ = tying, binding, ensnaring; grathita = strung, tied (RV 9.97.18; S'Br. 11) (Skt.lex.)

grantha = a book or composition in prose or verse; a code; grantha lipi = one of the various characters used in writ (Ka.lex.)

kr.ta = injured, killed; kr.ti = hurt, hurting, injuring; a kind of weapon, sort of knife or dagger (RV 1.163.3) (Skt.lex.)

krandukayyamu = tumultuous mob fight (Te.lex.)

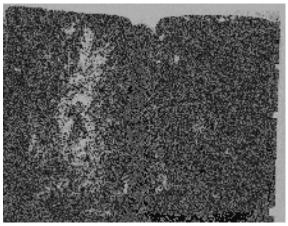
krandadi.s.t.i = having roaring speed or moving with a great noise, said of Va_yu (RV 10.100.2); kranda = a cry, neighing (AV 11.2.22); a cry, calling out (AV 11.2.2 and 4.2) krandanu = roaring (RV 7.42.1); krandya = neighing (TBr. 2.7.7.1,

parjanya krandya); krandana = crier; crying out; mutual daring or defiance, challenging (Skt.lex.). khar. = a call to cattle (Santali.lex.) khat. khat. = with a swish, thud, as of a horse's hoofs (Santali.lex.) kharajru = quick in motion (RV 10.106.7)(Vedic.lex.) kranditamu, krandanamu = cry, lamentation; krandillu = to sound, to resound (Te.lex.)

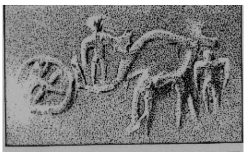


kratha = name of a race always named with the Kais'ikas and belonging to the ya_dava people; name of an Asura (MB h. 2.585; Skt.lex.)

kranta = the betrothal presents taken to the bride from the bridegroom's house (Te.lex.) **grantha** = giving, da_na; bha_gi, vibha_ga (Ka.lex.) [**kranta** = the meeting place of cross-roads; a lane; a hole (Te.lex.)] [Note: one of the 5 signs on the incised gold pendant shows an **X** pictograph. Could this connote a ratha? A present to the bride at betrothal.] The **X** pictograph appearing, as one of two signs incised on two tin ingots (**ran:ga**) found at Haifa, has to be explained, also perhaps in the context of semant. 'donation' of wealth, property.



grantha = wealth, property (Ka.lex.) [The reading of two signs on the two tin ingots: ran:ga grantha; tin, property or wealth]. Sumerian cylinder seal impression (ca. 2500 BC). After Amiet 1980a: pl. 108, no. 1435. The endless-knot appears over the onager drawing the warrior's chariot shown on the bottom register.



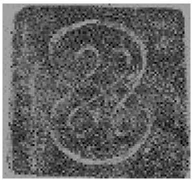
WHEEL. Figure 2. *Depiction of a wheel on a seal from Hissar IIIB.* Third millennium BCE. (After Littauer and Crouwel, 1979)

Cylinder seal. Alabaster. Ratha. Tepe Hissar IIIb in northern Iran. A horse-drawn tripartite-wheeled, two-wheeled chariot. After Littauer and Crouwel 1977: pl. 9b; cf. Asko Parpola, 1994,

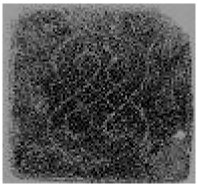


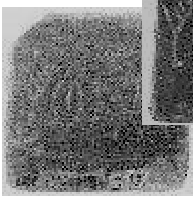
Fig. 8.17, p. 148. '...the earliest known representation of a horse-drawn chariot. The chariot has two cross-bar wheels, which represent a transitional stage between solid wheels and spoked

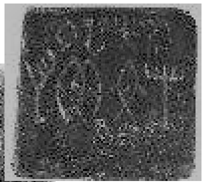




wheels...Archaeological evidence suggests a rapid dispersal of wheeled vehicles from the Near East through Transcaucasia and the Pontic steppe to central and northwestern Europe within a few centuries **in the late fourth millennium BC**.' (Asko Parpola, ibid., p. 148, 158).



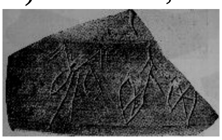




Inscribed objects containing the 'endless knot'

m-507 a,b; m-508 a,b (Incised copper tablets) m-1457 a,b

L-221 A (Pottery Graffiti; the sign shows two spoked-wheels and 'a person' standing between the two wheels)

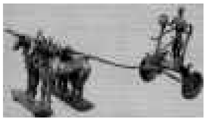


Chariot! on inscriptions

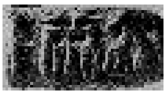
h-212 a,b On side a, the first sign shows a person standing on two spoked wheels, followed by a water-carrier sign. The ligature on both L-221 and h-212 seem to indicate that the two spoked-wheels are attached to the substantive connoted by the 'body' pictograph (it may be an:ga concordant with an:ka, war or battle); thus, the two spoked-wheel joined with the 'body' pictograph may connote a two-wheeled spoked-wheel, war-chariot.

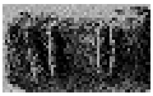
Sun-disc on model carriage. [British Museum, 1904, **A Guide to Antiquities of Bronze Age**, London, British Museum, Fig. 147]. '..there are four gold discs and one of bronze (in front of Case L), the significance of which has been verified by a recent discovery in Denkark. At Trundholm, in the northern Zealand, an engraved bronze disc, 6 in. in diameter, covered with gold foil, has been found mounted on a miniature carriage drawn by a horse. This was undoubtedly a ceremonial object, and connected with sun-worship, so that the discovery of more than one such disc in Ireland shows the extent of the cult before the first millennium BC, the Danish example being dated by Dr. Sophus Muller before the year 1000 BC.' (ibid., pp. 151-152)

Chariot with driver, Daimabad. Bronze. (Archaeological Survey of India)



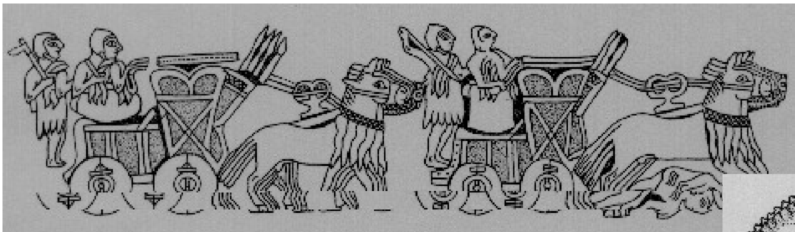
Onagers draw the Ur chariot. The onager is depicted on a rein ring and mascot from Queen Subh-ad's Chariot in Ur. ([V. Gordon Childe, 1929, **The Most Ancient East: the oriental prelude to European prehistory**, London, Kegan Paul, Trench, Trubner and Co. Ltd., Plate XXI a.)



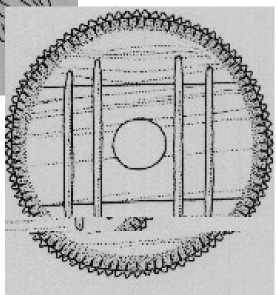




Detail of 'Standard' of Ur. London, BM 121201 (after Strommenger and Hirmer, M., 1964, *Five Thousand Years of the Art of Mesopotamia*, New York, Stronach D, pl. XI). Note the crossed struts at each end of the box, comparable to the design on Harappan and Chanhudaro chariot box. The box has a high front and is reinforced by diagonally crossed struts. The Mesopotamian example is like a battle-car and used in the military warfare context. This will certainly match with the R.gvedic metaphor on warfare.This 'standard re-inforcing design' of a chariot-box is repeated in other Mesopotamian pictorials. See figs. 13, 14, 20, 24, 57, 81, 83, many of which are described as 'battle cars' (M.A. Littauer and J.H. Crouwel, 1979, *Wheeled Vehicles and Ridden Animals in the Ancient Near East*, Leidenj, E.J. Brill, pp. 181-184) or 'rathas' in the semant. of the R.gveda. The Mesopotamian parallels show that a 'ratha' as a battle car could also have solid-, bipartite, or tri-partite wheels. The later designs of wheels have spokes varying in number from 4 to 12.



3

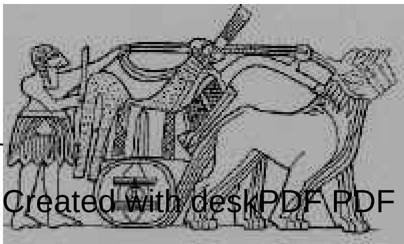


5

Wheel, Susa (after de Mecquenem 1943,fig. 89: 1-2 and pl. X:2)

Detail of stone plaque, Ur. Philadelphia, University Museum CBS 17086 (after Woolley 1934, pl.181: b)

The bipartite, tripartite and solid wheels also had tyres! (ne_mi or pavi are the words used in the R.gveda to describe tyres).



This will be elucidated from the examples found in Mesopotamia in a contemporary period (3rd millennium BC).

Carts of the Ancient Near East

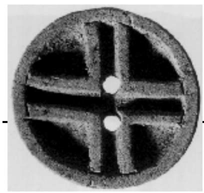
"Wheeled vehicles apparently developed in Sumer during the Uruk period, perhaps as early as 3000 BCE. The earliest type was a heavy, four-wheeled, ox-drawn wagon featuring a boxlike body and four solid wheels. Excavated remains reveal that these early wagons were relatively small, with bodies less than half a meter wide and wheels 50-100 cm in diameter. Covered wagons, with leather or linen covers, are represented in Sumerian models as early as 2500 BCE, as well as at Carchemish and Assur. Examples of some of the earliest remains and models of various types of wagons and carts are presented by Armas Salonen in his *Die Landfahrzeuge des alten Mesopotamien* (Helsinki, 1951, pp. 157-158). From this cumbersome wagon developed the somewhat lighter two-wheeled cart, which was still a ponderous affair, also borne on solid wheels...The Akkadian term for wagon, **eriqqu**, occurs frequently in Mesopotamian literature and in records from the earliest times through the Neo-Babylonian period (626-539 BCE)...A closed, four-wheeled, covered wagon is depicted on Ashurnasirpal's obelisk...Carts and wagons were used especially to transport heavy loads, such as large quantities of metal, timber, or military supplies (see Annals of Sennacherib 1.25). After the introduction of the horse as a draft animal in about 2300 BCE, a lighter type of two-wheeled cart was needed. This lighter vehicle, the precursor to the chariot, eventually evolved, thanks to a new technological development: by about 1500 BCE, Mesopotamian craftsmen had learned the technique of bending wood with heat, which enabled them to replace heavy disc wheels with much lighter spoked wheels. These wheels comprised four or six spokes connected to a rim of curved, joined felloes. The cart's cumbersome all-wood body was redesigned with a curved wooden frame overlaid with a hide or wicker covering. The new, light conveyance became highly popular, and within two or three centuries it had not only become a

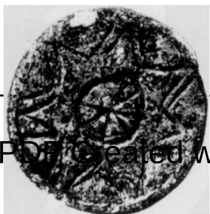
standard means of transportation in the Near East, but also penetrated as far away as Greece, northern Europe, India, and even China...During the Roman period...lighter vehicles included the **rheda**, a mule-drawn, four-wheeled cart using eight to ten mules, which could bear a maximum load of 450 kg.; the **carrus**, a four-wheeled cart, which carried 270 kg; the **verreda**, drawn by four mules, which carried two or three persons and upto 135 kg of goods; and the two-wheeled **birota**, drawn by three mules, which carried one to two passengers and a maximum of 90 kg." (Eric M. Meyers, ed., 1997, *The Oxford Encyclopaedia of Archaeology in the Near East*, OUP: David A. Dorsey, 'Carts', pp. 433-434). [Note the term '**rheda**' cognate with '**ratha**'; it refers to a wagon, not a battle car. Is **eriqqu** cognate with **ekka_**; or is the latter a derivative from **eka**, i.e. one horse-drawn cart?].

Pictographs which may depict "spoked-wheels"

Mr-16 (Mehrgarh, Period VII) Dmd-003a (Daimabad Seal)

L-233a (Lothal; spoked-wheel Graffiti, Period A)

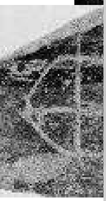




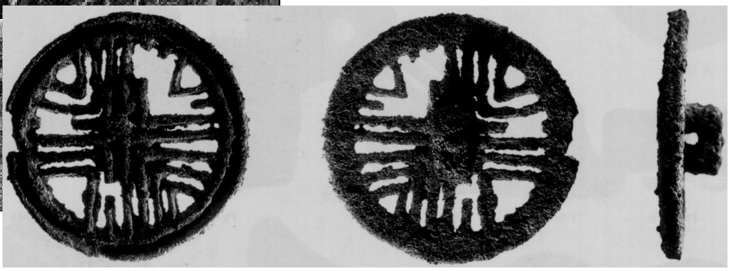
Mr-005 (Mehrgarh, Period IV)
Pk-024 (Pirak, Post-Harappan Period IB-II)



Rgr-003a (Rangpur Seal Impression shows uses of spoked-wheel sign)



Rgr-001 Potsherd depicting a wheel with four spokes



Pk-049(Pirak, Post-Harappan Period IIIB)

There are many pictographs of the inscriptions which indicate that a chariot with spoked wheel was made by the armourers. The zebu or bra_hman.i bull is often linked with signs depicting wheels with six spokes (one or two wheels) and ligatures of such signs. In one ligature, a canopy is overlayed on the spoked-wheel (ligatured with two short strokes), clearly indicating the chariot-box of the two-wheeled chariot.

The etyma are instructive that the word, 'ratha' is a loan from ra~t, rehr.a_, cart, -- rahr.u_, rehr.a_, raha -- in the linguistic area.

Since the 'endless knot motif', **grantha**, is associated with a chariot on the pictorial, the lexeme **ra~t** is clearly a derivative from **grantha**, which should be the old form connoting the battle-car.

grantha knot (TS); gantha bond (Pali); gan.d. knot (in string or wood), joint of finger (K.); gandhu joint, tie of friendship (S.); gat.hojor.o tying the marriage knot (OMarrw.)(CDIAL 4350). Gat.t.hana_ top unite (P.)(CDIAL 4349). Granthana stringing together (Pa_n. Va_rtt.); ga~_than id. (A.); ga~_t.han junction (G.); plaiting (M.)(CDIAL 4351). grhe_n.d. knot (Phal.); gre_n. knot (Dm.); gren log in a wall (Kho.)(CDIAL 4354). [The lexeme gets assigned as the name of a cursive script used for Devana_gari in Southern Bharat].

Battle, war

jan:ga = battle, war (G.lex.) san:gad.amu = an army; san:garamu = a battle, combat, conflict, war; san:gara_vani = battle-field (Te.lex.)

san:gin = a bayonet (Santali.lex.) s'an:kula = a chisel, a lancet; a pair of scissors (Te.lex.)

Homonyms

An artistic motif is used on pictographs of a tiger or an antelope; sometimes they are depifcted with their heads turned back.

The word is: san:gil = to look up, to raise or throw back the head (Santali.lex.)

S'an:khaka = a bracelet (made of conch-shell)(Te.lex.)

A pictograph to denote battle or war is a horn (sam:ga) or a pair (san:gad.a) of horns. Thus any ligatured pictorial motif involving a horn or horns may be an appellative for the weapon, for e.g., battle-axe, battle-adze, battle-sword, battle-shield, battle-dagger, battle-helmet.

Even tiger and elephant get horns in inscriptions. The horns may be represented by the ligature, two brackets or parenthetical marks,

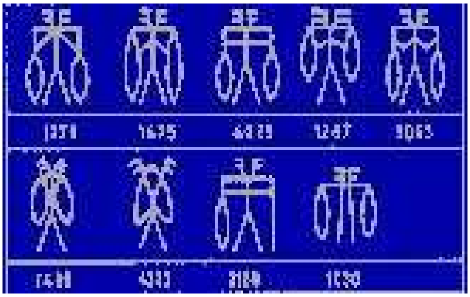
( )

Many pictographs get horns, including anthropomorphs with the body and legs of bulls. When the parentheses or horns appear, they may be read as:

sam:ga horn (Pkt.) s.a_n:g horn (Pas'.); sam.ga made of horn (Pkt.); sa_rn:ga made of horn (Sus'r.); bow (MBh.)(CDIAL 12499). s.an:gala a small horn (Pas'.)(CDIAL 12410). S'r.n:ga horn (sin:ga (Pali); sim.ga, sam:ga (Pkt.); s'ing (Gypsy); s.i_n: (Ash.); han:ga, an:ga (Si.); s'i_n:ga (Ko.)(CDIAL 12583).ucu_ horn (Pr.); s.o_ (Tor.)(CDIAL 12715). s'run:g horn (Kho.); s.ugo (Sh.)(CDIAL 12713).

So_ markhor (Ash.); co_w male markhor (Wg.)(CDIAL 12715). Lat. Cervus.

S'a_ran:ga spotted (Br.); a kind of deer (Skt.); sa_ran:ga a spotted deer (Pali); sa_ram:ga (Pkt.); sa_ra~g deer (Mth.); saranga_, saraga_ the spotted deer axis maculate (Si.)(CDIAL 12401). ha~_gul = the stag cervus wallichii (K.)(CDIAL 12410).can:gu = jew's harp (Tu.lex.)



san:gr.i, sagr.a, san:gr.a a pole carried on the shoulders of two men from which things to be carried are slung, to carry slung on a pole (Santali.lex.) jan:ga = being across, transverseness; a ceiling of boards etc. over a fireplace (Tu.lex.)

[Sign 15 variants]

m1405 a,b tablet; on side a, a person standing at the centre points with his right hand at a short-horned bull facing a trough, and with his left hand at the sign, Sign 15 and variants

This ligatured sign (Sign 15) may be read as: jan:gad.iya_ khan.d.a kanka = military guard's (who carries government treasury from one place to another – G. lex.) copper-work battle sword

Horse and the chariot

Meadow notes that the horse was domesticated in the highlands of central Asia by about 3000 BC and was used in Harappan sites only much later. (Richard H. Meadow, Animal domestication in the middle east: a revised view from the eastern margin, in: *Harappan Civilization: A recent Perspective*, ed. Gregory L. Possehl, 2nd. Ed., New Delhi, Oxford and IBH, 1993, vol. 1, 441-64).

On the contrary, Prof. Sándor Bökönyi, concludes with "the possibility of the occurrence of domesticated horses in the mature phase of the Harappa culture, at the end of the 3rd millennium B.C." (*South Indian Studies* 13, 1997, p. 300).

A Hittite text on horse-training and chariotry, written by Kikkuli (a Mitanni) uses Indic numerals to indicate the number of turns made by a chariot on a track: aika (India eka 'one'), tera (tri 'three'), panza (panca 'five'), satta (sapta 'seven') and na (nava 'nine').

Opening instructions from the Hittite text on horse-training by Kikkuli the Mitanni. In order to describe Kikkuli's profession, the text employs the Indic word assussanni (Skt. asvasani-).

'Thus (speaks) Kikkuli, the assussanni (the horse-trainer), from the land of Mitanni: When he lets the horses onto the meadow in the autumn, he harnesses them. He lets them trot 3 mails, but he lets them gallop over 7 fields. But on the way back he has them gallop over 10 fields. Then he unharnesses them, provides for them, and they are watered. He brings them into the stable. Then he gives them mixed together 1 handful of wheat, 2 handfuls of barley and 1 handful of hay. They eat this up. As soon as they have finished their fodder, he binds them close to the post.'

Archaeological evidence for the horse. Gorgan region southeast of the Caspian shows the first appearance of a domesticated horse about 3000-2250 BC. Surkotada in the Rann of Kutch, Gujarat, India has yielded bones of the horse, dated to mid-

third millennium BC. Tal-i Iblis in south-central Iran (3500 BC) and Selenkahiyeh in Syria (2400-2000 BC) also attest the presence of the horse. There is a cylinder seal depicting a horse-drawn vehicle excavated from Hissar IIIB. Linked with the evidence of the Mitanni horse-trainer, Kikkuli's horsemanship manual, the migratory route for the Indics would appear to have been through Hissar to Mesopotamia. There is a possibility that the spoked wheel for the chariot was an indigenous development within Mesopotamia, as an evolution from the two-wheeled onager-drawn cart into a spoked-wheel chariot drawn by horses prior to ca. 1600 BC. The incorporation of the indic elements in Mitanni should have taken place centuries prior to 1600 BC.

That the Kikkuli’s horse training emphatically employed Sanskrit words is further corroborated by a Hurrian text from Yorgan Tepe which indicates influence of Sanskrit words to describe the colour of the horse such as babru = Skt. Babhru = brown; parita_ = Skt. Palita = grey; pinkara = Skt. Pingala = reddish.

There are parallels between the as’vamedha and the Babylonian rites involving the offering of an ass or horse. The Babylonian incantation assigns the horse to draw the chariot of Marduk. (Keith, Arthur, 1947, Babylon and India, *Kuppuswami Sastri Commemoration Volume*, Madras, pp. 67-72). The Hittite ritual refers to the mule on the left side and horse on the right side of the chariot. (Mallory, J.P., 1989, *In Search of the Indo-Europeans*, London, p. 136).

“Although the appearance of the horse in Egypt and the island of Cyprus does not mean that the Indo-Europeans themselves reached these areas...there was excellent archaeological evidence to support the assumption that the Indo-Europeans and the horse came to the near east in the early second millennium BC.” (Thomas, Homer L., 1970, New evidence for dating the Indo-European dispersal in Europe, in: George Cardona, Henry M. Hoeningswald and Alfred Senn, eds., *Indo-European and Indo-Europeans*, Philadelphia).

R.gveda also refers to the chariot yoked with the ass in ceremonial occasions; a horse which is a swifter animal is yoked on the right (RV 3.53.6):

kada_ yogo va_jino ra_sabhasya yena yajn~am na_satyopaya_thah (RV 1.34.9)
hari te yun~ja_ pr.s.ati adbhu_ta_mupa_stha_d va_ji dhuri ra_sabhasya (RV 1.162.21)
yatra_ rathasya br.hato nidha_nam vimocanam va_jino ra_sabhasya (RV 3.53.5).

यमेन दुत्तं त्रित एनम् आयुनग् इन्द्र एणम् प्रथमो अध्य् अतिष्ठत्। गन्धर्वो अस्य रशनाम् अगृभ्णात् सूराद् अश्वं वसवो निर् अतष्ट ॥

1.163.02 Trita harnessed the horse which was given by yama; Indra first mounted him, and gandharva seized his reins. Vasus, you fabricated the horse from the sun.[Trita = Va_yu, as pervading the three regions; Yama = Agni; gandharva = Soma;Vasus = demi-gods or personified solar rays; su_ra = a_dityaman.d.ala, the solar sphere].

This report of the Gandharvas bringing their horses tied to a rope to the Aryan clients may indicate that the people of Gandhara, which generally is treated as covering the entire area beyond the Sindhu were part of the area of contact. This may be an indication that the horse was native to the Gandhara.

The north is the quarter from which horses and sheep were bought, and Gandhara was part of the trade network. As'vam ca avim ca uttaratah...etasya_m dis'I etau bhu_yis.t.hau (S'B 7.5.2.15) "The horse and the ram on the left (north) side...whence those two (kinds of) cattle are most plentiful in that region". (Eggeling, *Sacred Books of the EastSeries*, XLI, 404).

Bhagwan Singh makes a perceptive comment in regard to the problem of the Horse and the Aryans. "It may appear strange but it is true that the Aryans are in India since the time when they did not know of the steppe horse. To start with, they had

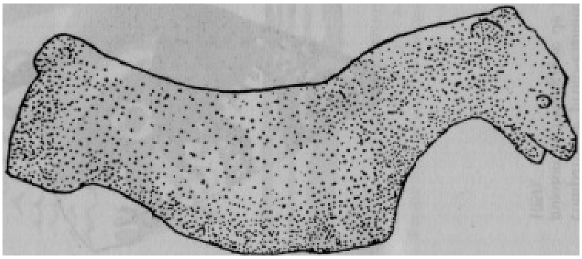
domesticated the ass. This much exploited and more ridiculed animal was at one time highly respectable (e.g. proper names such as as'vatara_s'va, gardabhi_vipi_ta) as it was tamed and trained and used both for traction and riding. More than that, it was used as a pack animal. Both as a carrier of dignitaries and as a source of profit, it was more intimately attended to and provided for by its master. They called this animal as'va (Pkt. Assa), 'the fast animal'. We do not know if they had any poor breed of horse (Cf. Alur, K.R., 1971, *Skeletan Remains (Verttebrate), proto-historic cultures of the Tungabhadra Valley*, Dharwar; Sharma, A.K., 1974, Evidence of Horse from the Harappan settlement at Surkotada, *Puratattva*, U: 75-76; Sharma, A.K.,1992-93, The Harappan horse was buried under the dunes of…, Puratattva, 23: 30-34) resembling the Indian pony. The R.gveda suggests that at an early stage either the distinction between an ass and a horse was so thin that the word as'va was applied to both horse and ass, or they know only the ass as attested by As'vins, deified 'horsemen', whose vehicle was ass-driven (RV. 1.116.2; AB 4.9; KB 18.1)...Turkey, the other center of Indo-European dispersion, was responsible for the cognates of as'va denoting horse such as Luwian a-su-wa; Mitanni a-as-su-us; Gothic aihwa; Tocharian B yakwe; Mycenean I-go; Latin equus; Venetic eku-; Old English eoh; Aulish epo; Old Irish ech; Lithuanian as-va (mare); and perhaps Greek hippo...We find Indo-Aryan (IA) s' preserved as 's' in the East European languages while it is replaced by h/h/q/g in the dialects of Central and Western Europe which received the linguistic im pulse from the Anatolian region. Again, IA 'a' is preserved in the former but replaced by e/I in the latter. It very clearly explains the division of Proto_indo-European (PIE) into Satem and Centum groups or, we may say, a new shoot of Centum from the main Satem trunk." (Bhagwan Singh, 1995, *The Vedic Harappans,* New Delhi, Aditya Prakashan, p.57, 67). As'va connoted an animal which moved faster than the other domesticated animals such as the bull or the goat. That the word as'va had this connotation is seen from compounds such as: aja_s'va (fast goat), pr.s.adas'va (fast spotted deer), which are, respectively, the vehicles of Agni and of Maruts. Consistent with phrases such as indramaham van.ijam codaya_mi (AV iii.15.1) and yena dhanena prapan.am cara_mi dhanena deva_h dhanamicchama_na_h (AV iii.15.5), which indicate the involvement of Indra and the devas in trade anc



commerce, the use of as'va or the Kutch ass (equus hamionus Khur) as a pack-animal may be related to such commercial activities.

Mohenjodaro, terracotta modelhorse (EJH Mackay, 1938, Further Excavations at Mohenjodaro, pl. LXXVII.11; p. 289).

Surkotada; leg bones of the 'domesticated' horse, ***equus caballus*** Linn. "…A.K. Sharma, has



reported, on 30th Nov. 1992, that he was supplied a report on the bones of a true horse from Kalibangan by the Zoological Society of India whose archaeologists have examined the bones…In 1974, A.K. Sharma published in *Puratattva*, No. 7, photographs of the bones of *equus caballus* Linn. Which JP Joshi had collected from Surkotada…The bones came from all the levels of the site – from the earliest to the latest…Alur (KR Alur, 1990, *Aryans and Indian History: an archaeo-zoological approach*, Archaeological remains of animals) also quoted several other sites with horse bones. In 1972-73 the site of Malvan in Gujarat was excavated by JP Joshi and FR Allchin. Here also AK Sharma had identified the bones of the true horse…The history of the domesticated horse in Central Asia goes back to 4500 BC to 4000 BC. (FE Zeuner, 1963, *A history of domestic animals*, London); hence the horse could be there in India also during the period from 4000 BC to 3000 BC"

(Pages 162-163, Plate VIIIb, S.P. Gupta, 1996, *The Indus-Sarasvati Civilization*, , Delhi, Pratibha Prakashan).

R.gveda has a reference to Indra riding an ass-driven car:

परा याहि मघवन्न् आ च याहीन्द्र भ्रातर् उभयत्रा ते अर्थम् ।

यत्रा रथस्य बृहतो निधानं विमोचनं वाजिनो रासभस्य ॥

3.053.05 Depart, Maghavan; come Indra; both ways, protector, there is a motive for you whether it be standing in your vast chariot, or liberating your neighing steed. [Both ways: ubhayatra te artham: Indra's wife awaits his return, the Soma libation invites his stay; protectorL bhra_ta_ = lit., brother; but here explained as pos.aka, nourisher. The word used is, 'ra_sabha', an ass (En g.), jackass, donkey, 'the brayer', an apparent early form of 'as'va'; ra_sabhasena is the name of a king on an epigraphic].

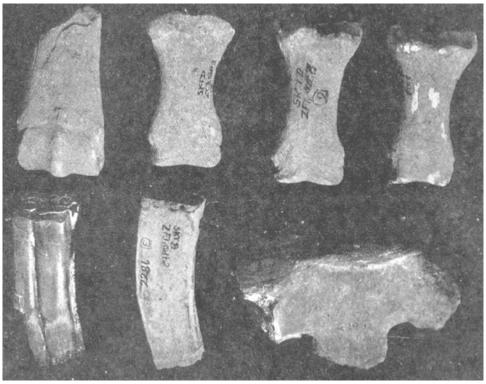
Bhagwan Singh also notes that as'va denoting 'ass' has many cognates widespread in Indo-European languages (opcit., p. 57):

Old English assa/assen, Gothic asilus, Dutch ezel, German esel, Icelandic asni/asna, Danish asen, Lithuania asilas, Gaelic asal, Welsh asyn, Latin asinus, Eng. Ass.

The word for horse is relatable to Dravidian cognates: Old English hors, Old High German hros, German ross, Icelandic hross, Latin equus, Greek hippo (onom. Hres.a_, neighing of a horse expressing satisfaction: hr.s. happiness); Dravidian gurram, from gur-gur, sound produced by a cub, puppy, nostril of horse; gurra_na_/ghur-ghur, ghot.a, ghod.a_ horse with semantic expansion: cf. grunt, cf. ghu_nt, ghud.akana_, also ghos.a loud call, clamour. The linguists who derived Skt. Ghota. From a Dravidian or Austric source failed to note the onomatopoeic sources of Indian dialects.

The Pra_kr.ti form – assa- can adequately explain the equivalance of the as’va with the ‘ass’, rather than with the ‘horse’.

It should, however, be noted that Mackay (1938, p. 289) considered that a clay model found at Mohenjo-daro represented a horse.



Surkotada: (Top row, from left, first: canon of equus caballus Linn.; bottom row, first and second: of equus caballus, Linn. And the others are examples of equus asinus and equus hamionus) (ASI). Meadow and Ajita Patel are, however unsure because the horse could have been introduced anytime during 2600-2300 BC, as Harappans were already in contact with the countries of horse domestication, but these data have never ever been published in adequate detail with detailed measurements, photographs giving well-defined levels and archaeological context. (Meadow, Richard H., and Ajita Patel, 1994, Urban zooarchaeology in South Asia: Harappa and Dholavira, *7th International Conference of the International Council of Archaeology*, Konstanz, Germany).

Equus Sivalensis and 34-ribbed horse

It is not mere poetic fancy that the steeds of the ratha of the as'vins are not a pair of equus caballus but gardabha-s, asses. The horse race is won by the as'vins. The horse, ass and onager were apparently viewed, in R.gvedic times, as belonging to the 'equus' species. It is known that the early chariots of Mesopotamia were drawn by onagers.

The chariots had evolved from solid-wheels to bi-partite and tri-partite wheels to four-spoked wheels and then six-spoked wheels in the 4th-3rd millennia BC and the technology seems to have radiated out of this civilization area. The presence of inscriptions with pictorial motifs depicting spoked-wheels, chariot-boxes and the archaeological finds of chariot-boxes made as copper models (Chanhu-daro) indicate that the technology was in vogue in the Sarasvati
Sindhu civilization area ca. 3500 BC.

The equus sivalensis seems to be a breed distinct from the equus caballus and the horse or as'va described in the R.gveda may refer to equus sivalensis with 34 ribs, a smaller-sized horse compared to the Arabian species. Whether this is relatable to the species equus agilis is also a subject matter for further scientific investigations.

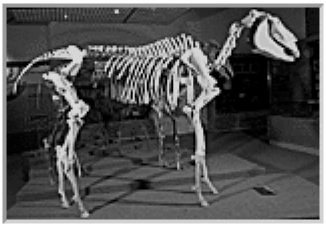
r.s.i: di_rghatama_ aucatthya; devata_: as'vastuti

चतुस्त्रिलतशद् वाजिनो देवबन्धोर् वङ्क्रीर् अश्वस्य
स्वधितिः सम् एति ।
अच्छिद्रा गात्रा वयुना कृणोत परुंष्भपरुर् अनुघुष्या वि
शस्त ॥

1.162.18 The axe penetrates the thirty-four ribs of the swift horse; the beloved of the gods, (the immolators), cut up (the horse) with skill, so that the limbs may be unperforated, and recapitulating joint by joint. [Thirty-four ribs: it is noted that other animals have only 24 ribs; unperforated: acchidra_ ga_tra_: the vis'asana karta_rah, or dissectors, are to utter the name of the parts, as heart, tongue,breast, as they divide them; and are to so separate them that they may not have holes or perforations, they may not be mangled].

Equus sivalensis

Close to Parus.n.i_, in the Markanda valley, a lot of faunal remains, dated as early as to the Pleistocene period, have been recovered from the Upper Siwaliks in general and the neighbouring areas in particular. Mention has been made of frequent occurrence, about 2.48 million years ago, of stegodon insignis ganesa, archidiskodon planifrons, elephas hysudricus, equus hysudricus, equus sivalensis, rhinoceros sivalensis, R. palaeoindicus, Sus sppp., camelus sivalensis, cervus spp., colossochelys atlas, geoclemys sivalensis, crocodylus spp. and a host of other new forms (Badam, G.L., Pleistocene Fauna of India, Pune, Deccan College; SN Rajaguru and GL Badam,Late Quaternary Geomorphology of the Markanda Valley, Himachal Pradesh, in: BP Radhakrishna and SS Merh, eds., *Vedic Sarasvati*, 1999, Bangalore, Geological Society of India, p.149).



"Pliocene The genus Equus appeared in early Pliocene of Northern America; around 2.5 My ago it dispersed to Asia (E. sanmeniensis, E. sivalensis, E. namadicus), Europe (E. stenonis, E. livenzovensis) and then Africa (E. koobiforensis). A later invasion brought to Eurasia E. hemionus and E. caballus. Equus also dispersed in the middle and late Pleistocene into Southern America. With the exception of Australia and Antarctica, **it had a worldwide distribution and survived undisturbed until about 10,000 years ago**, when overhunting by prehistoric men brought it to a drastic reduction in Eurasia and to extinction in the Americas, where it was reintroduced in post-Columbian times". http://www.unifi.it/unifi/msn/geopal/route/eqfr_eng.htm

"Species of the Equidae family found associated with the Hominid skull is Equus namadicus. It is either closely related12 to Lower Pleistocene E. sivalensis or inseparable13–15 from that. E.namadicus also shows resemblance to Late

Villafranchian E. stenonis of Europe and Central China16.This E. namadicus was subsequently replaced by E. hemionus khur during the Upper Pleistocene." http://www.iisc.ernet.in/~currsci/august/articles21.htm " “Antiquity of the Narmada: Homo erectus, the early man of India" Arun Sonakia* and S. Biswas Palaeontology Division, Geological Survey of India, Nagpur 440 006, India

Other references:

Falconer, H. and Cautley, P. 145-1849. Fauna Antiqua Sivalensis, Being the Fossil Zoology of the Siwalik Highlands in the North of India, Pt. 9. Smith, Elder and Co., London, pp. 1-92. [loc.cit. http://www.equinestudies.org/bibliogr.htm]

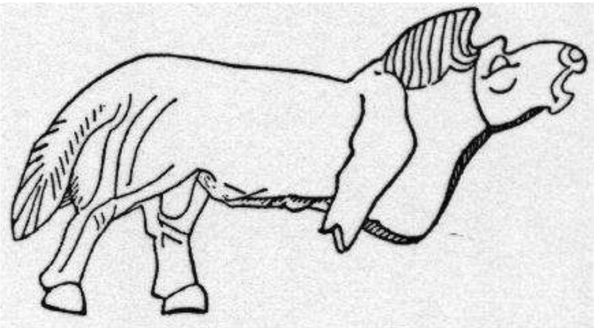
Hooijer, D.A. 1951. Observations on a calvarium of Equus sivalensis Falconer et Cauley from the Siwaliks of the Punjab, with craniometrical notes on recent Equidae. Extract *Arch. Néerl. Zool.* 8; pp. 243-266

See also: http://www.jps.net/kabalen/vedicindia.html (Paul Kekai Manansala)

Kikkuli, the horse-trainer

Kikkuli’s was a Mitannian of Hurrian descent and was a horse trainer (as’s’us’anni; cf. Sumerian ideogram for horse: ans’e kur.ra; ans’e gir.nun.na = mule). He wrote the manual in Hittite. It is noted that the Hurrian is’s’i(ia) is derived from Indo-Aryan as’va [Avestan aspa; Lithuaniahn es’va, as’va (mare)]. (A.Kammenhuber, 1961, ‘Hippologica Hethitica’, *Wiesbaden, O. Harrassowitz,* pp. 353 ff.) A synonym suggested for ans’e kur.ra is ans’e si-si— the old Akkadian word for horse, also used in Ur III economic texts. (M.Civil, Notes on Sumerian Lexicography, *Journal of Cuneiform Studies,* 20, 1966, pp. 121-22; cf. W. Von Soden, Akkadisches Handworterbuchb, vol. II, p. 1051, si_su). Sumerians has used the ass as a pack-animal. Moorey notes pictorial evidence for horse-riding in Ur III (ca. 2250-2150 B.C.) (P.S. Moorey, Pictorial evidence for the history of horse-riding in Iraq before the Kassite Period, *Iraq*, XXXII, 1970, p. 36-50).

Citing Ghirshman who held that the Indo-Aryans migratged from southeast of the Caucasus into the land of Mitanni, Mallory notes:

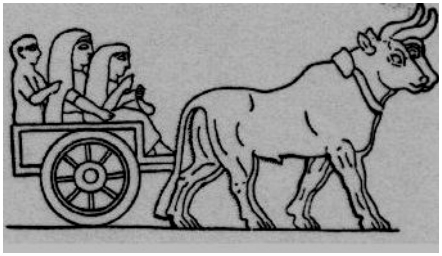


"Of Ghirshman's arguments, those pertaining to horse and chariot warfare demand our greatest attention, for here we find cultural elements that are inextricably associated with the specifically Indo-Aryan element in Mitanni and clearly set them apart from their non-Indo-European neighbours in the Near East. We have diplomatic correspondence between Egypt and Mitanni where the former requests both horses and chariots from the latter, indicating the Mitanni's reputation for horsemanship throughtout the Near East. We have already seen in the linguistic evidence, such as Kikkuli's manual on horsemanship, that the terminology of chariootry included distinctly Indo-Aryan vocabulary. Furthermore, the earliest evidence of the domestic horse is from Pontic-Caspian region, and all the present evidence suggests that it diffused from there through the Caucasus into Anatolia and perhaps around the eastern Caspian into northeast Iran. Hence the appearance of both horse and chariot have frequently been attributed to an explanation of Indo-Europeans from the north into Western Asia. Specially Indo-Aryan charioteers are seen penetrating the kingdom of Southwest Asia where in the case of Mitanni, they were able to dominate the local Hurrian substrate".(Mallory, J.P.,1989, *In Search of the Indo-Europeans*, London,pp,40-41).

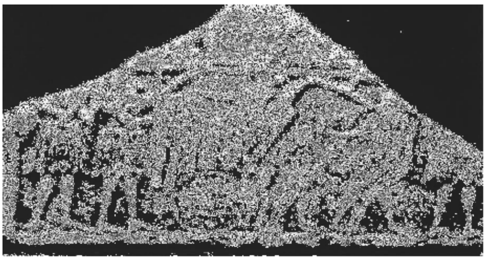
Susa, wild horse with short mane; from: Jequier, "Fouilles de Suse," Fig. 15, ***Memoires de la Delegation en Perse***, Vol. VII. In Mesopotamia, horse seems to

have been domesticated around the midpoint of the second millennium, perhaps imported from north of the Black Sea, particularly from Cappadocia.

Assyria, two yoked oxen pulling a cart (G. Contenau, ***Manuel d'archeologie Orientale***, A. Picard, 1931, Vol. III, p. 1215). "Cappadocian texts dating from the end of the third millennium have been discovered to be contacts between large firms and caravan drivers." (Maurice Daumas, opcit, p. 129).

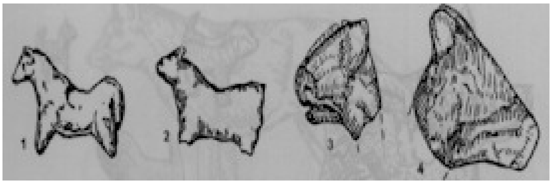


Ur Chariot, Photo G. Contenau, from: Maurice Daumas (ed.), ***A History of Technology and Invention***, New York, Crown Publishers, 1962, p. 130). The onager or wild donkey is seen on the tablets of Mesopotamia; skeletons of this animal have also been found in the royal tombs at Ur. "The Kingdom of Judea exported copper anr horses; at the beginning of the first millennium BC, King



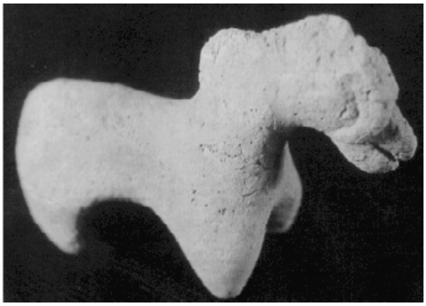
Solomon appears as a great merchant doing business through his port of Ezion-Geber, north of the Red Sea. The American excavations at Megiddo have uncovered the remains of large stables for the temporary housing of the horses. The horse was ridden with a simple saddle blanket, without stirrups; it was used almost exclusively for the war chariot, which was originally a seat on large wheels, and later a box that held from two to four occupants. The wagon, which had either two to four wheels, was sometimes pulled by oxen. The investigations of Lefebvre des Nouettes into harnessing practices in antiquity indicate that for the horse there existed only the neck collar, which strangled the animal when it pulled hard; the absence of the breech band still further diminished the usefulness of the horse as a

draft animal. It is possible that the Asian (or so-called Przhevalski's) horse is one of the ancestors of the Assyrian variety." (Maurice Daumas, opcit, pp. 129-131).



Horses at Pirak, Surkotada

Horse also appears at Pirak, located on the Kachi plain to the northwest of Jhukar. This is evidenced by a horse figurine (ca. 1600 BC); in the later levels of Pirak (Period II) the horse figurines are seen poainted with elaborate trappings and with attached wheels for use as movable toys.



Pirak, Baluchistan: terracotta figurine of a horse (Period 1b, ca. 1600 BC) (After Kenoyer, J.M., 1998, Fig. 9.10).

Lothal and Rangpur; Equid figurines (After S.R.Rao 1985: 483-484, Pl. CCVI, B and D; Rangpur: S.R.Rao, 1963: 137, Fig. 50). S.R.Rao observes (1979:219): “It is argued sometimes that the Harappans were non-Aryans as they had no knowledge of the horse and did not use rice, both of which played a dominant part in the daily life of the Aryans. This argument is not tenable anymore because horse bones have been found in the late levels of Harappa (Bhola Nath 1959: 358) and Mohenjodaro (Wheeler 1960: 65), and now in the Mature Harappan levels at Lothal (S.R. Rao 1973) and Surkotada. Terracotta figurines of horse occur at Rangpur (S.R. Rao 1963: 137-38) as well as Lothal. The earliest occurrence of rice in India is at Rangpur and Lothal in Mature Harappan levels. Obviously, horse and rice must have been known to the Harappans as early as 2200 BC.”

Hissar III B dated a little before 2000 B.C. yielded the skull of a horse; the horse was domesticated at Shah Tepe much earlier, thus long anticipating the first

appearance of it at Boghazkoy in Central Asia Minor in the early Hittite period. (Mallowan, p. 123).

In addition to the report on horse remains from Bronze Age site from Surkotada in Kutch (Sharma, A.K., 1990; Animal, bone remains. In, Jagat Pati Joshi, *Excavation at Surkotada 1971-72 and Exploration in Kutch*. Memoirs of the Archaeological Survey of India, 87: 372-83; Bokonyi, Sandor, 1996, Horse remains from the prehistoric site of Surkotada, late 3rd millennium BC, *South Asian Studies*, 13: 297-307), there are other sites where horse remains were found: Lothal (Bhola Nath and Sreenivfasa Rao, G.V., 1985, Animal remains from Lothal excavations. In, S.R. Rao, *Lothal: A Harappan port town, 1955-62*. Memoirs of the Archaeological Survey of India, No. 78, Vol. 2: 636-50), Malvan (A.K. Sharma 1990: 382) and Kanewal (Shah, D.R., 1980, A note on unmodified animal remains from Bagor. *The Eastern Anthropologist*, 24: 319-20:). The bones of equus hemionus have been discovered at Rojdi (Stack-Kane, Victoria, 1989, Animal remains from Rojdi. In, Gregory L. Possehl and M.H. Raval, Harappan Civilization and Rojdi. Delhi: Oxford and IBH: 182-84) and Surkotada (A.K. Sharma 1990: 375). A ‘domestic ass’ has been reported from Kalibangan (*IAR* 1964-65: 38) which may be equus hemionus. At Rana Ghundai in northern Baluchistan, the ass and the horse (equus asinus and equus caballus) were identified.(Guha, B.S. and Chatterjee, B.K., 1946, A chalcolithic site in northern Baluchistan: report on skeletal remains, *Journal of Near Eastern Studies*, 5(4): 315- 316).

Spoked wheel chariot, Ancient Persia.

It has been noted that onagers were used to pull the chariots in Mesopotamia. “(Onager) resembles a mule rather than an ass, but it is the colour of the latter. It is remarkable for its shyness, and still more for its speed: t a kind of shuffling trot peculiar to itself, it will leave the fleetest of horses behind.” (Elphinstone, M., 1819, *An account of the kingdom of Cabul and its dependencies in Persia, Tartary and India:*



Comprising a view of the Afghan Nation and a history of Dooranee monarchy, London: Longman, Hurst and Ree, Orm and Brown and John Murray.: Vol. I, 10).

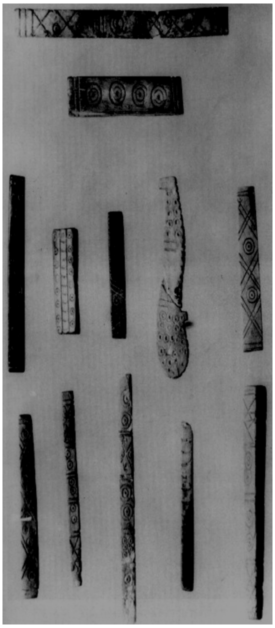
The early Vedic textual references to the horse are noted in the context of the chariots and no mention has been made of ridden horses or people on horsebacks. It is possible that the reference to the horse may indeed refer to the equus hemionus or the onager. “The onager is native to the Greater Indus Region and its name in Hindi and Urdu is ghor khar. It survives in the region today only as a small remnant population in the Ranns of Kutch (Ali 1946), but there may be a few remaining in southern Baluchistan (Roberts 1977: 161)… Horses and asses are useful as draft animals. There is no indication that they were ridden during the Indus Age, nor has attention been paid to bit wear, that would indicate the harness.” (Possehl, G.L., 1999, *Indus Age: The Beginnings*, pp. 188-9). The absence of the horse on the Indus seals and tablets is often cited to conclude that the Harappans did not domesticate the equus caballus. The bear is absent in the Harappan artifacts; the Asiatic Black Bear (*selenarctos thibetanus*) has its habitat of Pakistan, Baluchistan and through the mountainous north of the country (Roberts 1977: 108).

The Brown Bear (*Ursus arctos*) is found in the Himalayas. The cow and the sheep are also absent on the Indus seals and tablets; this cannot lead one to conclude that the Harappans did not domesticate cattle considering the preponderance of evidence of cattle bones found in many archaeological sites. Like the Mesopotamians, the Harappans might have used the onager or equus hemionus as a draft animal and to draw their chariots.

It is likely that the elephant was tamed and used by the Harappans to transport wood exported to Mesopotamia.

R.gveda refers to elephants in the context of a hunt for two wild elephants. (RV 10.40.4). The strength of the elephant is extolled in the Atharvaveda (AV 3.22). Alexander encountered war elephants ca. 326 B.C. in Indian battles. Kaut.ilya’s *Arthas’a_stra* refers to the art of capturing and taming elephants and using them in

war ridden by mahouts. “Elephants bred in countries such as Kalinga, Anga, Karusa and the East are the best; those of the Dasarna and western countries are of middle quality; those of Saurashtra and Panchajana countries are of low quality. The might and energy of all can, however, be improved by suitable training.” (Shamashastry, tr., *Arthas’a_stra*, 1960: 49). In Harappan sites, ivory has been used to craft a number of objects.



Mohenjodaro; Ivory objects. (ASI, Sind Volumes, Old Negative No. 800/92).

Meadow notes that the remains found of the camel (Hindi: *u_n.t.)* may relate, not to the single-humped camel (camelus dromedaries), but to the two-humped bactrian camel (camelus bactranus) (Meadow, R., 1984: 136). The two-humed bacterial camel was also present at Shahr-I-Sokhta (Compagnoni and Tosi 1975). The camel figurines from Pirak (dated ca. 1700 BC), near Nausharo and Mehrgarh on the Kachi Plain are also of camelus bactranus. Jim Shaffer notes that Shortughai might have allowed access to the acquisition of bactrian camels. (Shaffer 1987). A camel was depicted on a pick-axe (dated ca. 2000 BC) from Stein’s excavations at Khurab, grave E (Stein 1937: Pl. XVIII,E,I,258; K.R. Maxwell-Hyslop 1955; Zeuner 1955); this camel is identified as of the bactrian variety (Lamberg-Karlovsky 1969: 167-8).

A.K.Sharma, The Harappan horse was buried under the dunes of..., in *Puratattva*, Bulletin of the Indian Archaeological Society, No. 23, 1992-93, pp. 30-34]: "At Surkotada the bones of the true horse (equus caballus Linn.) identified are from Period IA, IB and IC. (radiocarbon dates: 2315 B.C., 1940 B.C. and 1790 B.C

respectively). With the correction factors, the dates fall between 2400 B.C. and 1700 B.C... In 1938 Mackay (FEM, Vol. I, p. 289) had remarked on the discovery of a clay model of horse from Mohenjodaro. 'I personally take it to represent horse. I do not think we need be particularly surprised if it should be proved that the horse existed thus early at Mohenjo-daro'. About this terracotta figurine Wheeler wrote: (Indus Civilization, Cambridge, 1968, p. 92): 'One terracotta from a late level of Mohenjodaro seems to represent a horse, reminding us that the jaw bone of a horse is also recorded from the same time, and that the horse was known at considerably early period in northern Baluchistan... It is likely enough that camel, horse and ass were in fact all familiar feature of the Indus caravans.'... appearance of true horse from the neolithic sites of Koldihwa and Mahagara in Uttar Pradesh..." (Note: camel is also not depicted on Harappan inscriptions) The identification by Sharma has been endorsed by Prof. Sandor Bokonyi, Director of the Archaeological Institute, Budapest, Hungary (an archaeozoologist); he wrote in a letter dated 13 Dec. 1993 to the Director General of the Archaeological Survey of India: 'Through a thorough study of the equid remains of the prehistoric settlement of Surkotada, Kutcha, excavated under the direction of Dr. J.P. Joshi, I can state the following: The occurrence of true horse (equus caballus L.) was evidenced by the enamel pattern of the upper and lower cheek and teeth and by the size and form of incisors and phalanges (toe bones). Since no wild horses lived in India in post-Pleistocene times, the domestic nature of the Surkotada horses is undoutbtful. This is also supported by an intermaxilla fragment whose incisor tooth shows clear signs of crib biting, a bad habit only existing among domestic horses which are not extensively used for war."

"Perhaps the most interesting of the model animals is one that I personally take to represent a horse.' (Mackay 1938, vol. I, p. 289; vol. II, pl. LXXVIII). Lothal has yielded a terracotta figure of a horse. It has an elongated body and a thick stumpy tail, mane is marked out over the neck with a low ridge. Faunal remains at Lothal yielded a second upper molar. Bhola Nath of the Zoological Survey of India and GV Sreenivasa Rao of the Archaeological Survey of India note (S.R.Rao, 1985, p. 641): 'The single tooth of the horse referred to above indicates the presence of the

horse at Lothal during the Harappan period. The tooth from Lothal resembles closely with that of the modern horse and has pli-caballian (a minute fold near the base of the spur or protocone) which is well distinguishable character of the cheek teeth of the horse.' "However, the most startling discovery comes from the recent excavation at Nausharo, conducted by Jarrige et al. (in press). In the Harappan levels over here have been found clearly identifiable terracotta figurines of this animal." (Lal, 1998, opcit., p. 112).

Another Hurrian text from Yorgan Tepe uses Indic words to describe the colour of the horses, for example, babru (Indic babhru 'brown'), parita (palita 'grey') and pinkara (pingala 'reddish'). The Mitanni charioteer is called marya (Indic-Vedic marya 'warrior, young man'). Added to these are a series of names of the noblemen or aristocracy of Mitanni which are clearly Indic. The conclusions are: "an element of Indic-speaking chariot warriors superimposed themselves on a native Hurrian-speaking population to form a ruling dynasty that endured for several centuries...there are also possible (though disputed) Indic traces in the names of a few gods revered by the Kassites (Surias and Marytas: i.e. Su_rya and Maruts)...By the thirteenth century the Mitanni kingdom collapses which sees an end to the Indic presence in Southwestern Asia..." (J.P. Mallory, opcit, 1989, p. 38).

"We cannot reconstruct Proto-Aryan religious terms--and much less Proto-Aryan religious ideas--by simply and naively projecting Rigvedic data into Proto-Aryan times. A reconstruction can be attempted only by a careful confrontation of Vedic and Avestan terminology'. (P. Thieme, 'The 'Aryan' gods of the Mitanni treaties', ***JAOS***, 80, 1960, 301-317). The same conclusion was argued by Sten Konow (***The Aryan gods of the Mitani people***, Christiania, 1921).

"It is now generally agreed by most authorities on the subject that the Aryan linguistic vestiges in the Near East are to be connected specifically with Indo-Aryan, and not with Iranian, and also that they do not represent a third, independent Aryan group, and are not to be ascribed to the hypothetically reconstructed Proto-

Aryan. This conclusion is incorporated in the title of M. Mayrhofer's bibliography of the subject, ***Die Indo-Arier im alten Vorderasien*** (Wiesbaden, 1966), and it can now be taken as the commonly accepted view. It is based on the fact that where there is divergence between Iranian and Indo-Aryan, and where such elements appear in the Near Eastern record, the latter always agrees with Indo-Aryan. Such items are aika 'one' and s'uriyas' 'sun' and the colour-names parita-nnu and pinkara-nnu which correspond to Sanskrit palita- 'grey' and pingala 'reddish'.

"...the name of the capital of the Mitanni state, Was's'ukanni...we should see in the first member a noun vasu 'wealth', and not an adjective vasu- meaning 'good' as in Iranian (Av. vohu-). In this case the second element is obviously khani- 'mine', the whole meaning 'mine of wealth (i.e. precious metals)', and this explanation provides the motive which attracted those Proto-Indoaryans to this region. It was an age when prospecting for metals, precious or otherwise, was being actively pursued, and the Aryans were as much interested in this activity as anybody else. It is understandable that when it came to their knowledge that a new and large deposit of such materials has been found, it would stimulate them to attempt to get control of that territory...

"...the division of Proto-Aryan into two branches, Indo-Aryan and Iranian, must have taken place before those languages were established in their eventual homes, and not merely be due to developments which took place within each of the two groups after the Indo-Aryans had settled in India and the Iranians in Iran. This conclusion could only be shown to be wrong if it could be shown that the Vedic Indians, having migrated all the way to the Punjab from their earlier home, had then retraced their steps and undertaken yet another migration in the direction of the Near East. Konow was prepared to believe this, but there is no evidence for it, and it seems that a theory involving such complication can be safely ignored...A further conclusion from this is that the date of the Proto-Aryan period must be pushed back further than has often been thought, and probably it cannot be brought down below 2000 BC, at the latest.

"...The identification of the Aryan traces in the Near East as Proto-Indoaryan has, in Thieme's words, 'considerable historical implications'...

"... The Iranian name (haraxvaiti_) is a loan word from Proto-Indoaryan, with a substitution of h- for s-, occurring also in hindu-..Another case is the river name sarayu_, which was transferred from Iran (haraiva-/haro_yu_) to a river in North-West India, and then again from there to a tributary of the Ganges in eastern India...

"...Of the four divine names mentioned in the Mitanni treaty...Varun.a would remain exclusively Vedic...There is, however, no reason to believe that Indra and Na_satya ever belonged to the Iranian religious tradition...They are gods which were being worshipped by the Proto-Indoaryans in eastern Iran when Iranians gook over the country...The geographical horizon of the Avesta is almost exclusively eastern Iranian...but eventually the defences of the Proto-Indoaryans to the west were overcome, and this was followed by massive Iranian immigration into central and western Iran...

"The usually accepted date of Zoroaster is based on a tradition dating from Sasanian times which places him 258 years before Alexander...very influential scholars have adopted it, notably A. Meillet in 1925 and W.B. Henning in 1951 (A. Meillet, ***Trois conferences sur les Ga_tha_s de l'Avesta***, Paris, 1925; W.B. Henning, ***Zoroaster***)...The conclusion that the old Yas'ts and in particular the Fravardin Yas't are to be dated before the migration of the Iranians to central and western Iran provides a basis for calculating the date of Zoroaster, since we can begin from the earliest mention of the Medes and Persians in the Assyrian annals, which occurs in the second half of the ninth century BC (Parsua 844 BC, Madai 836 BC)...If we take the hundred years between Zoroaster and Sae_na and add them to the period represented by the four generations from Sae_na to Utayutay, we arrive at a period of 200 years at the very minimum between Zoroaster and the composition of the Yast. Adding this to the date 900 BC suggested above as the time of the movement west of the Iranians, we obtain 1100 BC as the lowest

possible date for the founding of the Zoroastrian religion...We may conclude the Iranian conquest of eastern Iran was an event that took place not later than the fourteenth century BC and it thus coincided with the period when the Proto-Indoaryans had their furthest extension westwards. At this time large numbers of Indo-Aryans had migrated into India, and as a result of these two migrations the position of the Proto-Indoaryans in their original base in eastern Iran must have been considerably weakened, thus providing the Iranians with an opportunity to move in and take over.

"...Since the Proto-intoaryans must have been in north-western Iran in order to reach the Mitanni country, it will not be unreasonable to suggest an Indo-Aryan etymology for this name (Lake Urmiya), if one is available. Such an etymology is available if we compare Skt. u_rmi- 'wave' and u_rmya- 'undulating, wavy' which would provide a suitable descriptive name for the lake. This is a case where the phonology of Indo-Aryan and Iranian have diverged quite widely (cf. Av. varemi- 'wave') and it is interesting that the name of this lake, if the above etymology is correct, should go so clearly with Indo-Aryan." (T. Burrow, The Proto-Indoaryans, ***JRAS***, 1973, No.2).

Horse in Sarasvati Civilization

In as’vamedha, the horse is secured with a bag containing gold, the reins and the foot-fetter:

यद् अश्वाय वासं उपस्तृणन्त्य् अधीवासं या हिरण्यान्य् अस्मै ।

संदानम् अर्वन्तम् पड्बीशम् प्रिया देवेष्व् आ यामयन्ति ॥

The cloth which they spread as a covering for the horse; the golden (trappings with which they decorate him), the head-ropes, the foot-ropes, all these they offer as acceptable to the gods. [As a covering for the horse: at the time of Horse. The issue of domestication of the horse is still an open question. “It is erroneous to say

that during the third millennium the Indo-Europeans were nomad horsemen—or in central Asia nomad cameleers. Both assumptions are based on false a priori hypotheses and misdated stratigraphic finds. Even today the chronology of central Europe and even more of Central Asia in the Neolithic, Early and Middle Bronze periods is almost hopelessly confused. Until archaeological chronology has been clarified, and the exact level in stratified sites, at which remains of domesticated horses and camels are found, has been fixed, it is idle to speculate about equine nomads as bearers of early Indo-European migratory movements." (I.E.S. Edwards et al, *Cambridge Ancient History*, Cambridge, CUP, 1968, vol. 1, part 2, pp. 139-40).

R.gveda refers to three types of horses: va_ji, race horse (107 citations), arvan, steed (98 citations), as'va, vaulting horse (11 citations). Another term used for horse is: atya. (aratha_ ayukta_ atya_so, the fast horses without chariots and unyoked: RV 9.97.20).

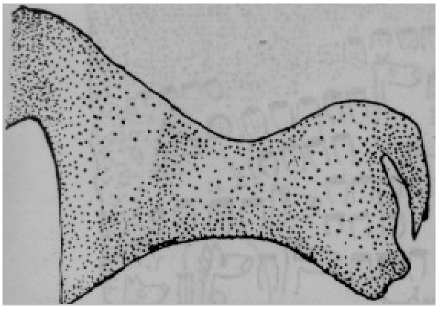
putting the horse to death, the adhi_va_sa (cf. *Ka_tya_yana Su_tra* 145), a curtain is held,behind which the principal queen lies through the night by the side of the horse].

R.gveda refers to the living horse of King Trasadasyu and is named dadhikra_ (RV 4.38). Gandharva held the bridle of etas'a horse (RV 1.163.2). S'atapatha Bra_hman.a notes that 27 gandharvas yoked the horse first. (5.1.44.8). Two other names of horses are: paid.va (of Pedu) and Ta_rks.ya (of Aris.t.anemi).

A fossil has been discovered from the Siwalik hills (Himalayan foothills): with short-pillare teeth and find limbe the horse is 15-hands long and perhaps date back to the stone age. (J.C.Ewart, Animal remains, in J.Curle, *A Roman frontier post and its people (The Fort of Newstead)*, Glasgow: J. Mackehose and Sons, 1911, Appendix II, pp. 364,368). E.J. Ross reported the discovery of bones scattered over an area of about 40 ft., of a domesticated horse in the lowest level of Rana Ghundai I, close to Mohenjodaro and Ga_ndha_ra (pre-Harappan, contemporary with Hissar

IA, Susa B and Middle Uruk in Iraq, assigned to ca. 3500-3400 B.C.) in a chalcolithis site of Northern Baluchistan. 'It should be noted, however, that these remains are not, as might be expected, those of small pony-like animals. The teeth were well examined by an expert veterinary officer before their dispatch to the



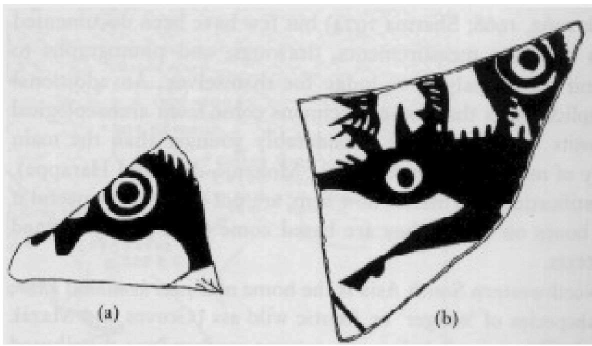


Archaeological Department and he assured us that they are indistinguishable either in structure or in size from those of our modern cavalry horses. This points to a very long previous period of domestication'. (E.J. Ross, Rana Ghundai, a chalcolithis site in Northern Baluchistan, *Journal of Near Eastern Studies*, 5, 1946, pp. 284-516; R.H. Dyson, Problems in the relative chronology of Iran 6000-2000 B.C. in R.W. Ehrick, *Chronologies in old world archaeology*, Chicago, Univ. of Chicago Press, 1965, pp. 215-50).

Rangpur, terracotta figure of horse (S.R.Rao, Lothal and the Indus Civilization, pl. XXIII.A). Lothal: terracotta horse

Anderson notes about this discovery of the fossil: '…(bones) sufficient numbers to suggest not only that the horse was already domesticated but that the site itself may possibly have been a camping ground for nomad riders'. (A.J.K. Anderson, *Ancient Greek horsemanship*, Berkeley and Los Angeles, Univ. of California Press, p. 10). Sewell and Guha note the similarity between the Mohenjodaro horse and the Anau horse, based on the examination of horse bone fragments found in habitational remains: right half of the mandible (premolar and molar teeth) and fragment of the same teeth of the left side. 'In size the fragment of jaw corresponds exactly to that of a skull of a modern horse (*equus caballus*) of the Zoological Survey of India'. (Col. Sewell and Guha, The Zoological Remains, in: John Marshall's *Mohenjodaro and the Indus Civilization*, London, Probesthain, 1931, vol. II, pp. 653-54).



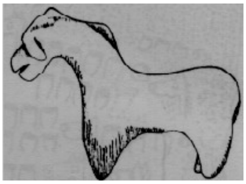


The bones found at Harappa were examined in 1936 and 1959. Prasad notes that the bones were those of *equus asinus linn*., the Indian ass. (B.Prasad, Animal remains from Harappa, *Memoirs of the Archaeological Survey of India*, 51, 1936, pp. 28-29). Bhola Nath notes that the copious bones which came from the pit of area G of Harappa (4'-5' 10" below the surface level), in a habitational setting, were those of the Indian 'country-bred' horse. (Bhola Nath, Remains of horse and Indian elephant from prehistoric site of Harappa, *Proceedings 1st All India Congress of Zoologists*, Calcutta, part 2 (scientific papers), 1959, pp. 1-14). Bhola

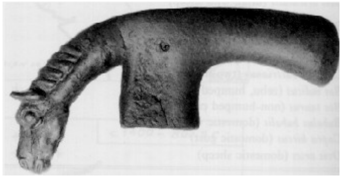
Nath also found horse bones from Rupar and Lothal sites. (Bhola Nath, Advances in the study of prehistoric and ancient animals in India—a review, *Records of Zoological Survey of India*, Vol. 61, Calcutta, 1963, pp. 3-17). Horse bones were reported from Surkotada, Rann of Kutch (ca. 2100-1700 B.C.); the bones have been dated to 2400-1700 B.C. Horse bones found at Kalibangan II were dated to 2900-1900 B.C. (MASCA correction). (A.K.Sharma, Evidence for horse from the Harappan settlement at Sutkotada, *Puratattva*, VII, 1974, pp. 75-76; The Harappan horse was buried under the dunes of…*Puratattva*, 23, 1992-93, pp. 30-34).

Pictorial motifs/terracotta or clay figures of horse have been found at Mohenjodaro, Rangpur, Hbirkot Ghundai and Pirak. Jarrige and Santoni note that the Pirak find is 'small thickset horse with stylized tufts of hair over the eyes' and occurs in a post-Harappan layer. The terracotta horses are found in all levels of Pirak. (J.F. Jarrige and M.Santoni, Fouilles de Pirak, Vol. II, Paris: la commission des fouilles archeologiques, 1979). The find at Pirak is dated to Parak I and II (ca. 1800-1300 BC). The bones of a horse come from Period III (ca. 1300-800 BC).The find of a horse painted on a sherd is dated to Period IV Bir-Kot Ghundai (1700-1400 B.C.) (G.Stacul, Harappan post-urban evidence in the Swat Valley in B.B. Lal and Gupta, S.P., *Frontiers of the Indus Civilization*, New Delhi, Books and Books, 1984, pp. 271-75; fig. 31.2). Out of 158 equid bones found at Bir-Kot, 13 have been identified as those of *equus caballus.* Horse bones have been found in Kheda district of Gujarat, from Harappan settlements. (Lal and Gupta, opcit., p. 233). The continued use of the horse in India is attested by the finds of a bone of equus caballus at Hallur (south India), together with rock-paintings which show horses and riders with metal ob jects like sword, dated to ca. 1500-1050 B.C. (B.&R Allchin, *The rise of civilization in India and Pakistan*, London, 1983, pp. 287-88; 99).

Bir-kot Ghundai, Swat valley, northern Pakistan, horse painted (black on red) on potsherd; representations (a,b) of the horse on black-on-red painted pottery (latter half of the ghalegay IV period—ca. 1700-1400 BC; after Stacul, 1987, fig. 46, f,h).



Pirak (period IB), clay horse.



Shaft-hole axe with horse head. Afghanistan, early second millennium BC. Copper alloy. 7.9cmX14.9cm. Metropolitan Museum of Art, New York, 1989.281.39. After Pittman 1984, 70, fig. 32. (Bactria and Margiana Archaeological Complex or BMAC I and II are dated to ca. 1900-1700 BC and 1700-1500 BC. BMAC had many kinds of weapons, typically representing animal motifs on shaft-hole axes.

haya = horse (Skt.) a_cu – hilt (Ta.); a_yuga = handle of a sword (Ka.)(DEDR 342).

"A terracotta figure found by Mackay in his excavations at Mohenjo-daro was identified by him as that of the horse. This identification has been accepted by many but not all. However, in recent years a lot of new light has been thrown on the issue. Lothal has yielded not only a terracotta figure of the horse but also the second right upper molar of that animal. To recall what Bholanath of the Zoological Survey of India has stated, the tooth 'resembles closely with that of the modern horse and has pli-caballian (a minute fold near the base of the spur or protocone) which is a well distinguished character of the cheek of the horse' (in S.R. Rao 1985: 641). Surkotada has yielded quite a few bones of the horse, which have been identified as such not only by A.K. Sharma but also by Sandor Bokonyi, an internationally recognized authority on the anatomy of the horse. To repeat one of his significant observations; 'The occurrence of true horse (equus caballus L.) was evidenced by the enamel pattern of the upper and lower cheek and teeth and by the size and form of incisors and phalanges (toe bones). Since no wild horses lived in India in post-Pleistocene times, the domestic nature of the Surkotada horses in undoubtful.' Horse remains have been identified at Kalibangan too; and Bholanath also states that an earlier collection from Harappa examined by him did contain

remains of the true horse. However, no horse-bones have so far been reported from the current excavations at the site. Finally, attention must be drawn to the discovery of terracotta figurines of the horse by Jarrige and his colleagues (in press) in the Harappan levels at Nausharo in Pakistan." (B.B. Lal, 1997, The Earliest Civilization of South Asia, New Dehli, Aryan Books International, pp. 285-286).

It is a debatable issue if the appearance of the horse and the chariot can be treated as an ethnic marker for the Indic speaking peoples.

Mel Mallowan (1965, *Early Mesopotamia and Iran*, London, Thames and Hudson, p. 123) notes: "...dating Tepe Hissar IIIB a little before 2000 B.C... in Hissar IIIB the skull of a horse was found and furthermore the horse is alleged to have been domesticated at Shah Tepe much earlier still, thus long anticipating the first appearance of it at Boghazkoy in Central Asia Minor in the early Hittite period...." Tepe Hissar is a key archaeological site with vivid links to the Sarasvati Sindhu civilization with many seals, motifs, artefacts...

"Third Millennium. "...different types of axes: single, double-bladed, or fenestrated, they functioned as ritual, ceremonial, and currency-exchange objects, in addition to military usage. Various knives, spears, daggers, slings, and throwing-sticks were also used...The Stela of the Vultures from Lagash (circa 2500) portrays a very tightly formed phalanx of foot soldiers with overlapping spears held horizontally and with rectangular shields, and this sculpture is the clearest evidence from the period for battle formation. It suggests a highly trained and disciplined force...Two main types of chariots are known: the four-wheeled 'battle-car', conveying a spear-thrower, and the two-wheeled chariot, which may have been developed for the hunt. Since horses seem to be unknown in Mesopotamia until the end of the third millennium, some other kinds of equid -- perhaps onagers -- acted as draft animals. The vehicles were very heavy: their wheels were of solid timber, perhaps banded with tires of rawhide, metal or wood. The axles were probably fixed to the wheels and so rotated with them. The draft pole was straight, and fixed very low down at the front. Such vehicles cannot have been either swift or maneuverable; they appear

to belong always to men of very high status. Indeed, it may in marking status that their importance lies, rather than as a practical asset in war...(Horses seem to have appeared in Mesopotamia around the end of the third millennium.)...

“The Second Millennium...War was a seasonal activity: many workers were allowed to cultivate palace ilku-land (state-owned fields farmed in return for a share of the produce; the right to farm them could be inherited, but carried the duty of military service) in return not only for a tithe of produce but also for duties that included military service and corvee work, especially on canals...Kassites, whose origin may lie in the mountains to the northeast of Mesopotamia, formed enclaves within Babylonian cities and put their specialist skills as horsemen at the disposal of native Akkadians; during this time the horse was bred and trained in Mesopotamia. Certain technical developments made the chariot a slightly more viable vehicle for battle: the spoked wheel was invented, perhaps in Syria, and lightened the whole. Although the bridle still controlled the horse by means of a nose ring at the beginning of this period, the mouth bit, at first rigid and then soon jointed, emerged to give a far easier control. Kings and persons of very high status began to be shown shooting with a bow and arrow from their chariots, which seem to have served as mobile firing platforms in battle, helping to disrupt putative lines off infantry and picking off stragglers...

“The Amarna and Middle Babylonian Periods...Battle chariots regularly had two wheels, mostly with four spokes (although six, eight and nine are also known), and were drawn by a pair of horses, with one or two more running beside them as outriggers. A chariot-owning aristocracy arose, known as **mariyannu/martianni** which is thought to come from a word of Indic origin. Aryan involvement is confirmed by a horse-training manual found in the Hittite capital Bogazkoy (ancient Khattusha), in which many technical terms are given in an Aryan language related to Sanskrit. The charioteers were based on the palace, and individual terms for officers are often identical with terms for court officials. Warfare was more international than before: the Semites and Hurrians of Mesopotamia met Hittites and Egyptians on battlegrounds in Syria, the country which appears to have led in



technical developments. The time and expense involved in training and equipping for the chariot-owning aristocracy was such that soldiering became a more professional, hereditary occupation which affected activity all year round even though campaigns remained seasonal (Stephane Dalley, 1995, Ancient Mesopotamian Military Organization, in: Jack M. Sasson (ed.), ***Civilizations of the Ancient Near East***, Vol. III, pp. 413-422).

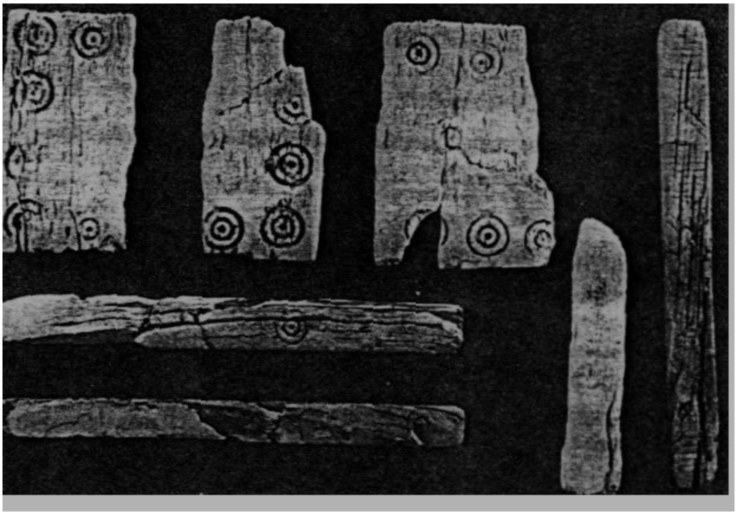
Armour: the body shield

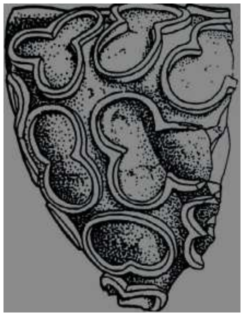
"The body shield. The most common type of Mycenaean shield was aopparently the figure-of-eight shield shown. It is seen on wall-paintings and described in detail by Homer. The reconstruction is based on these sources. The frame consists of two bow-shaped pieces of wood fastened to form a cross. The horizontal has a short reinforcing piece whch acts as a grip. The shield is made of several layers of toughened bull's hide glued and stitched to a wicker core. The rim, as described hy Homer, is of leather." (John Warry, 1980, *Warfare in the Classical World*, Norman, University of Oklahoma Press, p.13). It is notable that the 'trefoil' design is comparable to the motif which recurs on Indian civilization artifacts. An 'endness knot motif' also occurs and is comparable to this figure-of-eight shield. Could the Hyksos Asiatics have come from The Sarasvati-Sindhu doab?

Mohenjodaro: fillet or ribbon headband with circular inlaid ornament on the forehead and similar ornament on the right upper arm; two ends of the fillet fall along the back; combed hair at the back (the flat back may have supported a bun); two holes beneath the ears suggest an ornament attached to the sculpture; right shoulder is left bare; left shoulder is



covered with a cloak decorated with trefoil; double circle and single circle designs were originally filled with red pigment; eyes may have held inlay; upper leip is shaved; short, combed beard. (white-steatite, 17.5cm. high, 11 cm. Wide; DK 1909: Karachi, National Museum, 50.852; Marshall 1931, 356-7, pl. XCVIII). The figure





also has a unique fillet on the forehead and the upper garment is worn leaving the right shoulder bare, a practice which continues in Bha_rat right into the historical periods.

The trefoil motif also occurs on bull figurines indicating the association of the ‘dotted circle’ motif with hide used for a shield. (d.ha_l, shield). Traces of red pigment were noted in the trefoils decorated on the body of a bull. Fragment of a steatite statuette from Mohenjodaro (Sd 767). After Ardeleanu-Jansen 1989: 196, fig. 1.

Finds at Atlyn-depe: ivory sticks and gaming pieces (?) obtained from Sarasvati Sindhu civilization; similar objects with dotted circles were found in Mohenjodaro and

Harappa. What does the dotted circle connote? ‘Fish-eyes’ mentioned in Mesopotamian texts, connoting ivory?

Transition to Bronze-age: evidence from R.gveda

Mineral wealth was signified by the term: vasu; vasa a_ccha_dane = hidden or concealed wealth, perhaps a reference to the ores held in the earth, giving the epithets vasundhara_, vasudha_ to connote the earth. Hence, vasva a_kara is a term which connotes mine of metals and minerals. The eight Vasus were deities related to mines. Vasus uncover everything: vasavo yat vivasate sarvam; if ‘vivas’ connotes living at a distance, the reference may be to travels to distant places to mine the ores. Vasus is a frequently occurring epithet in the R.gveda (cited 568 times). The rivers were a source of the Vasus: vasu sindhu_na_m पादे (RV 1.46.9). Vasus are the guardians of covered or hidden wealth (RV 10.77.6: **vida_na_so vasavo ra_dhyasya**). Vasus are the solid wealth. (**sthu_ram na kaccid bharanto’ vasyavah**: RV 8.21.1; **sthu_rasya ra_yo br.hate ya is’e**: RV 4.21.4). Mountaisn are mineral-rich: **bhu_ris’r.n:ga ga_vah**: RV 1.154.6.

Agni is dravita_, the smelter. Dravin.oda was the deity of the dravis, the smelters. dra_vayati - melts or to melt (RV. .3.4); dravi = smelter or metalsmith who melts metal (RV. 6.3.4: tignam...paras'uh na jihva_m dravirna dra_vayati da_ru dhaks.at: fire devours wood with its axe-like sharp tongue, just as the smelter melts the metal). Sa_yan.a interprets dravi as a goldsmith, svarn.aka_rah, dra_vayita_ (Vedic)

dravin.a = the wealth or gem that is obtained by melting, e.g. gold and silver (RV. 4.5.11; 4.23.4; 4.33.10; 9.109.9; 10.70.7)

dhama = to blow (in a furnace)(RV. 10.72.2)
dhma_tari_ = the blower or the metalsmith; dhma_teva dhamati s'is'ite dhma_tari_ yatha" = as the blower blows to produce sharp flame (RV. 5.9.5)

The mine field is vraja (RV 1.131.3; 4.51.2) or gomati vraja (RV 5.34.5; 7.27.1) or as'ma vraja (4.1.13; 10.139.6). The term, 'bhara' is a synonym for a mine, a mine which is full of wealth: **bilam bharam bhavati** (RV 1.32.11). Divoda_sa was of the house of the Bharatas, an apparent allusion to the control over the mines. Bha_radva_ja is also a term derived from bhara, dealing with mining activities. The metal workers had to travel long distances in search of the ores, guided by Ja_tavedas; it will be argued elsewhere that soma pavama_na refers to smelting and processing of ores and minerals, electrum or gold-silver quartz, in particular. The crucible is the ayohat dron.a. Agni assists in the process and hence, is: pa_vaka, dravitnu, s'uci-jihva, dravin.oda, vasupati, pa_vaka-s'ocis.

किं नो अस्य द्रविणं कद् ध रत्नं वि नो वोचो जातवेदश् चिकित्वान्।
गुहाध्वनः परमं यन् नो अस्य रेकु पदं न निदाना अगन्म ॥

4.005.12 What is the value of this (wealth) to us? what is its advantage? inform us, Ja_tavedas, for you know; (tell us) what is the best (course) for us on this secret path, so that we may follow unreproached the direct road.

Vasus reside in the ditch or tunnel of a mine:

इमे रध्रं चिन् मरुतो जुनन्ति भृमिं चिद् यथा वसवो जुषन्त ।
अप बाधध्वं वृषणस् तमांसि धत्त विश्वं तनयं तोकम् अस्मे ॥

7.056.20 These, Maruts, encourage the prosperous man; they encourage the (poor) wanderer; they, as Vasus, are pleased (with you); showerers (of benefits), dissipate the darkness; grant us many sons and grandsons.

The association of Maruts with metallurgy is apparent in almost every r.ca referring to the Maruts. They use weapons and tools to break the rocks; the weapons used by them are: rambhin.i, va_s.i, r.s.t.i, s'aru, as'ma_, pavira, kr.ti. The terms: **adrimasta** (RV 1.61.7) and **adribhid** (RV 6.73.1), a reference to the miners.

1.037.02 Who, borne by spotted deer, were born self-radiant, with weapons, war-cries and decorations. [va_s'i_bhih = with sounds or speeches; i.e. with cries terrifying the enemy's army; vas'i = va_c, speech, voice].
1.039.05 They make the mountains tremble, they drive apart the forest-trees. Go, divine Maruts, whither you will, with all your progeny, like those intoxicated.
1.168.04 Mutually supported, they descend readily from the sky; immortal Maruts, animate us by your own words (to praise you); exempt from toil, present at many (sacrifices), brilliant-eyed, the Maruts ahve shaken the firmest mountains.

The Vasus were close to the area from which the horse was imported: su_ra_t as'vam vasavah niratas.t.a (RV 1.163.2)

1.163.02 Trita harnessed the horse which was given by yama; Indra first mounted him, and gandharva seized his reins. Vasus, you fabricated the horse from the sun. [Trita = Va_yu, as pervading the three regions; Yama = Agni; gandharva = Soma; Vasus = demi-gods or personified solar rays; su_ra = a_dityaman.d.ala, the solar sphere].

dyumna = precious ores (RV 7.25.3: asme dyumnam adhi ratnam ca dhehi)

a_kara = mine (RV 3.51.3: a_kare vasoh jarita_ panasyate; 5.34.4; 8.33.5: ya a_karah sahasra_ yah s'ata_magha indro yah pu_rbhida_ritah); a_khara = mine (RV 10.94.5)

khan, kha_ta = to dig up, excavate (RV 4.50.3: tubhyam kha_ta_ avata_ adridugdha_ madhvah s’cotantyamito viraps’am) avata = a well, cistern (RV)

Arthas’a_stra refers to gu_d.aha kha_ta; this term is explained as: maha_s’ila_pihit dva_ra bilam, i.e. the tunnel opening sealed with massive boulders.

अभिनक्षन्तो अभि ये तम् आनशुर् निधिम् पणीनाम् परमं गुहा हितम्। ते विद्वांसः प्रतिचक्ष्यानृता पुनर् यत उ आयन् तद् उद् ईयुर् आविशम्॥

2.024.06 Those sages, who searching on every side, discovered the precious treasure (of cattle) hidden in the cave of the Pan.is, having seen through the false (illusions of the asura), and again coming (thither) forced an entrance. [Those sages: the an:girasas; the allegory is explained: the cows hidden in the caves are the rains accumulated in the clouds, which are set free by the oblations with fire, of which the an:girasas were, no doubt, the authors].

अयं निधिः सरमे अद्रिबुध्नो गोभिर् अश्वेभिर् वसुभिर् न्यृष्टः। रक्षन्ति तम् पणयो ये सुगोपा रेकु पदम् अलकम् आ जगन्थ ॥

10.107.07 (The Pan.is). This treasure, Sarama_, secured in the mountain is composed of cows, horses and riches; the Pan.is protect it who are good watchers; you have come to this lonely spot in vain. [Lonely = resounding with the lowing of the oxen].
(Griffith): They who with much endeavour searching round obtained the Pan.i’s noblest treasure hidden in cave. Those sages having marked falsehood turned them back whence they had come and sought again to enter it.

The reference to marked falsehood may in fact be gu_d.ha kha_ta, the mine openings sealed with boulders. The Pan.is had their treasure hidden under the rocks:

(Griffith): Paved with rock is this our treasure chamber; filled full of precious things, of kine, and horses. These Pan.is who are watchful keepers guard it. In vain hast thou approached this lonely station.

बृहस्पते या परमा परावद् अत आ त ऋतस्पृशो नि षेदुः ।
तुभ्यं खाता अवता अद्रिदुग्धा मध्वं श्चोतन्त्य् अभितो विरप्शम् ॥

4.050.03 Those (steeds), Br.haspati, which had come from that distant (region), the best (of all), have sat down in connection with the ceremony, and to you the Soma juices expressed by the stones flow copiously, (accompanied) by the sounds of praise, like deep wells that supply water.

> The lexeme, pan.ya refers to ore quarried from mines. Arthas'a_stra (2.12.84) refers to this: khanibhyo dva_das'avidham dha_tu pan.yam ca sam.haret; evam sarves.u pan.yes.u stha_payenmukhasan:graham. The treatise also underlines that the minerals are the principal source of treasury and royal authority (2.12.85): akaraprabhavah kos'ah kos'a_ddan.d.ah praja_yate; pr.thivi_ kos'adan.d.a_bhya_m pra_pyate kos'abhu_s.an.a_.

Bhagwan Singh notes (1995, *The Vedic Harappan*s, Delhi, Aditya Prakashan, p. 224) that the term revata_ used in the context of Pan.is may be related to the mount Revand mentioned in reference to Vis'ta_spa:

"When Zoroaster brought the religion...Vis'ta_spa put the a_dar-burzenmihr on its cultic place on mount Revand, which is also called pus't-e-Vis'taspa_n that is revant of Yt. 19.6...This Revand—another one lies not far south—is situated

northwest of Nishapur, not far from Tos, near the turquoise mines (Herzfeld, Ernst, 1947, *Zoroaster and His World*, Princeton, I, 81-82). The Revand is a mountain in Khorasan on which the Burzin fire is settled. (*Avesta*, Bund. 12.18; Sirrozah 1.9)

Alternatively, the refernce may be to the mountain Revataka in Saura_s.t.ra which yielded carnelian.

न रे॒वता॑ प॒णिना॑ स॒ख्यम् इन्द्रो ऽ॑सुन्वता सु॒तपाः सं गृ॑णीते ।

आस्य॒ वेदः॑ खि॒दति॒ हन्ति॑ न॒ग्नं वि सुष्व॑ये प॒क्तये॒ केव॑लो भूत् ॥

4.025.07 (Indra), the drinker of the effused Soma, contract no friendship with the wealthy trader who offers not any libation; he takes away his wealth; destroys him when destitute; but he is a special (friend) to him who presents the libation and oblation.

उप॑ नः॒ सव॒ना ग॑हि॒ सोम॑स्य सोमपाः पिब । गो॒दा इद् रे॒वतो॒ मदः॑ ॥

1.004.02 Drinker of the Soma juice, come to our (daily) rites, and drink of the libation; the satisfaction of (you who are) the bestower of riches, is verily (the cause of) the gift of cattle.

न रे॒वता॑ प॒णिना॑ स॒ख्यम् इन्द्रो ऽ॑सुन्वता सु॒तपाः सं गृ॑णीते ।

आस्य॒ वेदः॑ खि॒दति॒ हन्ति॑ न॒ग्नं वि सुष्व॑ये प॒क्तये॒ केव॑लो भूत् ॥

4.025.07 (Indra), the drinker of the effused Soma, contract no friendship with the wealthy trader who offers not any libation; he takes away his wealth; destroys him when destitute; but he is a special (friend) to him who presents the libation and oblation. vala = the personificatin of the mines and passes (RV)

Both the terms, atharvan and navagva are used as synonyms in R.gveda. "...they (Atharvans and Navagvas) are credited with having entered a mountain pass (RV 1.112.18; RV 5.29.12), breaking mountain ranges (RV 1.62.4; 1.71.2; 4.2.15; 4.3.11), obtaining riches (RV 7.52.3), breaking mineral rich mountains (RV 4.2.15), winning cows (RV 1.62.2), and possessing miraculous powers (RV 3.53.7). These seers called Navagvas and Das'agvas are seven in number (sapta vipra_: RV 4.2.15) and reminding us of the number of stars in the constellation by their names. They are remembered as manes or **pu_rve pitarah** (RV 3.55.2: fathers of the old times who know the region; RV 9.97.39: our sires of the old who knew the footsteps, found light and stole the cattle), and are said to be conversant with the stations, padajn~a_ (RV 9.97.39). They are not only recalled in the course of overland journeys, but also during sea voyages (RV 8.12.2) spreading over ten months (RV 5.45.11)." (Bhagwan Singh, 1995, *The Vedic Harappans*, New Delhi, Aditya Prakasan, p. 198).

adrim rujan an:girasah raven.a (RV 1.71.2)

divasputra an:giraso bhavema adrim rujema dhaninam s'ucantah (RV 4.2.15)

4.002.15 May we seven priests first in order engender from the material drawn the worshippers of the creator (Agni); may we An:girasas be the sons of heaven, and, radiant, divide the wealth-continuing mountain. [May we, An:girasas, be the sons of heaven: divasputra_ an:giraso bhavena, or, may we, the sons of heaven be An:girasas; or, bhu_timantah, possessed of superior power. The An:girasas are the sons of A-ditya, an:girasa_m a_dityaputratvam a_mna_gyate; the text is: tasya yad retah prathamam udadipyata tad asau a_dityo abhavat, ityupakramya ye an:ga_ra_ asanste an:giraso abhavan, that which was his seed was first manifested as A_ditya, thence, in succession, those which were the cinders became the An:girasas; wealth-containing mountain: a_drim rujema dhaninam, may allude to the rock in which the cows were hidden; or, adri may be rendered cloud (megha), by the disruption of which rain is made to fall].

r.tena adrim vyasan bhidantah (RV 4.3.11)

4.003.11 By the sacrifice, the An:girasas, rending the mountain asunder, have thrown it open, and returned with the cows; the leaders (of holy rites) have arrived happily at the dawn, and the sun was manifest as Agni was engendered. [The sun was manifest: an allusion to the early morning sacrifice with fire, probably instituted by the An:girasas].

saran.yubhih phaligam indra s'akra valam raven.a darayo das'agvaih (RV 1.62.4)

1.062.04 Powerful Indra, who are to be gratified with a laudatory and well-accented hymn by the seven priests, whether engaged for nine months, or for ten; and, desirous of (safe) protection, you have terrified by your voice the divisible fructifying cloud. [vipras (priests) are an:girasas: (1) those who conduct sacrifices for nine months; and (2) those who conduct the sacrifices for ten months. The seven priests are Medha_tithi and other r.s.is of An:giras lineage. valam = cloud; adrim = that which is to be divided by the thunderbolt; phaligam = that which yields fruit; alternative: adri = mountain; phaliga = a cloud; vala = an asura].

The period of nine or ten months may relate to the duration of time taken on journeys in search of and mining the ores. It should be noted that the Phoenicians in their journeys to ports of the Arabian Sea took two years to circumnavigate, circumventing Africa (Birt, Philip, 1964, *Finding about Phoenicians*, London). The two sessions of nine months and ten months may refer to (1) the sea route across the gulf to the tin sources on the Tigris-Euphrates; and (2) the land route across Afghanistan to mineral resources on the northwestern mountain ranges.

turan.yavo an:giraso naks.anta ratnam devasya savituriya_na_h (RV 7.52.3)
yena_ nah pu_rve pitarah padajn~a_ arcanto an:giraso ga_ avindan (RV 1.62.2)
divasputra_so asurasya vi_ra_h (RV 3.53.7)

Copper-belt in the Marubhu_mi or Rajasthan helped the transition from chalcolithic to the bronze age

Sites of neolithic cultures have been discovered in areas beyond the locus of the Sarasvati-Sindhu civilization, south of the Vindhyas in South India and beyond the Ganga-Yamuna doab in Eastern India. These cultures were contemporary with the Harappan civilization with indications of contact. One surmise is that the electrum used in the Harappan civilization came from Kolar, Karnataka in South India.

Floods on the Indus and tectonic disturbances in NW India resulting in the desiccation of the Sarasvati river, may perhaps be the principal reasons for the movement of the people of the Harappan civilization towards the South and East of the Sarasvati-Sindhu doab.

Shortugai in Afghanistan and Alamgirpur in the upper Ganga-Yamuna doab were full-fledged Harappan settlements and not merely trade-contact sites. Vedic geography is coterminus with the eastern and northern parts of the present-day Afghanistan, the whole of Pakistan and Punjab, Haryana, northeastern rajasthan and northwestern Uttar Pradesh in India. This region was served by two great, perennial rivers: Sindhu and Sarasvati.

Kantli river was a tributary of the Sarasvati river and was close to the Khetri group of copper mines in Rajasthan. These mines may have provided the principal source of copper of the Harappan settlements. In Ganeshwar (Sikar district, Rajasthan), copper celts, chisels, spearheads, arrowheads, bangles and spiral-headed pins were found, some of which reminisce the Harappan types (Agrawala, R.C. and Kumar, 1982). However, the black-on-red pottery of Ganeshwar do not compare with the Harappan pottery types. The Ganeshwar complex is assigned to the second and third quarters of the third millennium BC.

In Cholistan region, Mughal has found a total of 377 sites: of these, 99 sites belong to the earliest period called the Hakra Ware (four varieties of red ware) period

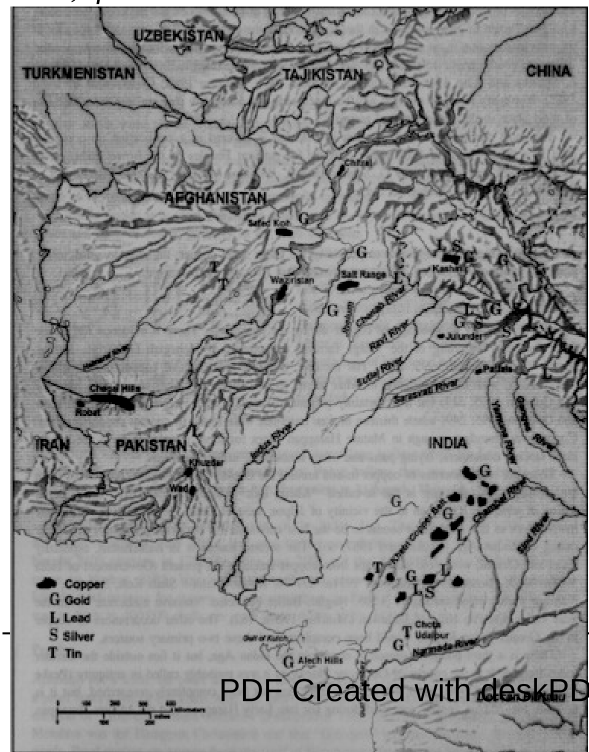
(more than half of these sites seem to have been shifting camps; many are regular settlements; some of the sites on ancient dunes which indicate that dune-formation had already started before the second half of the fourth millennium BC); 40 sites to the pre-mature Harappan period; 174 to the mature Harappan period; 50 sites of the late Harappan times; 14 sites to the Painted Grey Ware culture. In the mature Harappan period large-sized sites were noted. Ganweriwala was 81.5 hectares, almost the same size as that of Mohenjodaro. At many sites, a clear separation of the residential area and the industrial area was noted, signifying an increased pattern of specialization in production, trade and commerce. (Mughal, 1990).

"Nausharo. The first occupation over here goes back to the beginning of the third millennium BC... pottery shapes and painted (such as fish-scale, humped bull, pipal-tree)... Period III at Gumla, dating back to the first quarter of the third millennium BC, yielded such pottery types as dishes-on-stand and vessels with a flanged rim, which later on became characteristically Harappan...even the typical Harappan ratio used in the mud bricks, viz. 4:2:1 had also come into being. Period I of Rehman Dheri assignable to ca. 3000 BC has yielded graffiti-marks which may have contributed to the Harappan signary...a series of sites in the basins of the Indus and Ghaggar and their tributaries. Of these...Amri and Kot Diji in the lower Indus valley; Jalilpur and Harappa in the middle Indus; and Kalibangan, Banawali and Kunal in the Ghaggar-Sarasvati valley... it would be seen that the northwestern part of the Indo-Pakistan subcontinent witnessed a cultural development right from the neolithic times, with many currents and cross-currents operating within the area... from about the close of the fourth millennium BC there came into being a cultural stage--designated variously as Kot Diji I or Kalibangan I or even Sothi culture, which had many elements that subsequently went into the making of the Mature Harappan civilization... around 2600-2500 BC there was a great spurt not only in internal but also in external trade. It must have necessitated the installation of a system of weights for weighing goods that were purchased in local markets and sent out... it is precisely these very features-- weights, measures, a script and seals-- that stand out as the most significant differentiae between the Formative and Mature stages of the Harappan civilization... in all likelihood it was in the Ghaggar-Sarasvati valley and in the adjacent Ravi and lower Indus valleys that the Mature

Harappan 'revolution' took place... Jalwali and Gamanwala (Cholistan) measure as much as 22.5 and 27.3 hectares respectively. This suggests that in this valley even during the Early Harappan times large towns had begun to come up-- a feature which may have given rise to bigger settlements, viz. the cities... At Kot Diji, the excavations brought to light, between the Kot Dijian and Mature Harappan levels, a layer of ash, burnt earth, charcoal etc..." (B.B. Lal, 1997, opcit, p. 90).

Transition to bronze age: evidence from archaeometallurgy

“At least eight metals were known to the people of the Indus Age: copper, tin, arsenic, gold, silver, electrum, antimony and lead…Copper. There was certainly no shortage of copper during the Indus Age. There is evidence for its use from the very beginning of the village farming community at Mehrgarh I (Jarrige, C., Jarrige, J.F., Meadow, R.H., and Quivron, G., 1995, *Mehrgarh: Field reports 1974-1985, from Neolithic times to the Indus Civilization*. Karachi: Department of Culture and Tourism of Sindh, Department of Archaeology and Museums, French Ministry of Foreign Affairs: 246). Th melting, possibly smelting, of copper may begin in Mehrgarh II, with the appearance of what seems to be copper slag (ibid: 319) but it is certainly present in Period III there (ibid: 249) where thirteen broken crucibles were found to contain copper residues. Copper was abundant enough in Mature Harappan times for these peoples to have used it for large storage containers, frying pans and other household, utilitarian needs. There



are many sources of copper in and around the Greater Indus Region, but two of them are prominent.

Metal Resources of the Indus Age (After Possehl, G.L., 1999, Fig. 3.105)

To the east is the so-called ‘Khetri Belt’ which stretches from the Udaipur region of southern Rajasthan to the vicinity of Jaipur, west of Delhi. There are many mines in this area and it seems to be the best candidate for the principal source of copper during the Indus Age (Chakrabarti, D.K.,1987, The pre-industrial mines of India. *Puratattva*, 16:65-71). The second source is Baluchistan, especially Kalat and Chagai, where old slag heaps from copper smelting are present (Govt. of India, 1908, *Imperial Gazetteer of India: Provincial Series, Baluchistan*. Calcutta: Superintendent of Govt. Printing: 48-9; Hassan, M.U.,1989, Prehistoric mines around Khuzdar Baluchistan, *Journal of Central Asia*, 12(1): 107-16; Marshall, 1931: 677-78). Robat, Malik-I-Shah Koh, Saindak, Ras Koh are places noted on Figure 3.105. Hughes-Buller collected ‘massive malachite’ from the Wad Valley and Pab Hills of Jhalawan (Minchin, C.F.,1907, *Jhalawan District*. Bombay: Govt. of India. Baluchistan District Gazetteer Series, Vol. 6B (bound with Sarawan District, Vol. 6 and Kachhi District, Vol. 6B: 162). The other occurrences of copper in the Greater Indus Region would have complemented these two primary sources. There is a third potential source of copper in the Indus Age, but it lies outside the Greater Indus Region. It is the copper of Oman, or Magan as it was probably called in antiquity (Peake, R.H.,1928; The copper mountain of Magan. *Antiquity*, 2: 452-54 Weisgerber, G.,1980, …und kupfer in Oman, *Der Anschnitt*, 32: 62-110;1981, Mehr als kupfer in Oman—ergebnisse der expedition 1981. *Der Anschnitt*, 33: 174-263; 1983, Copper production during the third millennium BC in Oman and the question of Makkan. *Journal of Oman Studies*, 6(1): 269-76; 1984, Makan and Meluhha—third millennium BC copper production in Oman and the evidence of contact with the Indus Valley. In, B.Allchin, ed., *South Asian Archaeology 1981*. Cambridge: Cambridge University Press: 196-201). The topic has not been completely researched, but it is possible that Magan copper was used during the late Early Harappan and the Mature Harappan Stages.”

“Tin…Its utility lies in its alloying properties with copper to make bronze. Adding three to four percent of tin to copper produces a harder metal and one that casts better because the tin inhibits the metal’s ability to take on oxygen..There is little tin in Pakistan and northwestern India. Most of it is found in the southern Khetri Belt, with an extension south into Gujarat (Sabarkantha and Panch Mahals). Discussions on this with K.T.M. Hegde led to the conclusion that there may well have been placer tin in the rivers of the western Ghats during antiquity and that this has been so completely worked out that the evidence is gone. It would have taken millions of years for those deposits to accumulate and they could have been totally exploited in a few decades. There is no tin in Baluchistan…Afghan tin is now seen as the most likely source for the peoples of the Indus Age…Arsenic. Arsenic is important to the Indus Age in the sense that it too, can be combined with copper to produce bronze. The ores of arsenic are principally realger and orpiment. *The Wealth of India* (Govt. of India, 1985: Vol. 1 435) reports the following sources of arsenic: Kashmir (Lashteal, Barali and Zaskar); Haryana (Gurgaon district); Uttar Pradesh (mountainous districts); Rajasthan (associated with the copper mines near Khetri, at Batai and Bagor); Gujarat (Panch Mahals district)…Arsenic bronzes occur with high frequency during the Mature Harappan and arsenic was an important mineral to the Harappan smiths (Agrawal, D.P.,1971, The Copper Bronze Age in India. Delhi: Munshiram Manoharlal: 150-52). There is some doubt that it was ever mined separately, the alloy emerging from the arsenic which sometimes occurs naturally in copper ore. The close association of arsenic with copper in the Khetri Belt suggests that this may have been at least one of the sources of arsenic during the Indus Age.” (Possehl, G.L., 1999, p. 231-234).

Herodotus (Book III, 94, Godley 1926): “The Indians made up the twentieth province. These are more in number than any nation known to me, and they paid a greater tribute than any other province, namely three hundred and sixty talents of gold dust.”

The reference to gold dust indicates that the source of gold was placer gold in Pakistan, Afghanistan and northwestern India. Gold was panned on the Indus and Sarasvati Rivers (See Possehl's map indicating Gold sources). Sources of silver begin on an arc from Udaipur traversing through the Khetri Belt into the outer Himalayas into Kulu, Kashmir and Afghanistan. Silver is found associated with lead and copper ores and co-occurring sources may denote the sources of Harappan silver.

"Recent geological reconnaissance in south-western Afghanistan has located substantial deposits of lead, copper, silver and gold together with iron mineralization and alluvial cassiterite (tin). This last occurrence has been confirmed by a French archaeo-metallurgical survey that has also evidenced the antiquity of mining in the whole area (Berthous, et al.,1977, *Les Anciennes Mines D'Afghanistan* (Rapport Preliminarie). Paris: Commissariat a l'Energie Atomique, Laboratorie de Researche des Musees de France, Unite de Researche Archaeologique, No. 7)(Jarrige, C. and Tosi, M.,1981, The natural resources of Mundigak:some observations on the location of the site in relation to its economic space. In, H.Hartel, ed., *South Asian Archaeology 1979*. Berlin: Dietrich Reimer Verlad:115-42). Carnelian (which is heated chalcedony or agate) is found in the rivers of Gujnarat. Large agates are found at Rajpipla on the Narmada River. Sources of lapis-lazuli were: Badakshan, Pamir and Chagai Hills. (Delmas, A.B. and Casanova, M., 1990, The lapis lazuli sources in the ancient east. In, Maurizio Taddei, ed., *South Asian Archaology 1987*. Roma: Instituto Italiano per il Medio ed Estremo Oriente, Serie Orientale Roma, 66(1): 493-505). Turquoise was found in the Ajmer Hills of Central Rajasthan, Chagai Hills and in the Central Asian desert region known as Casal Kum. Steatite and other soft stones are widely distributed in the Greater Indus Region.

Tin from Sahr-i-sokthe

"...(Sumerians of the Late Uruk period) established a colony on the acropolis of Susa (biblical Shushan, modern Shush), where the southern Iranian trade route to

northwestern India began. Its original purpose was to obtain carnelian, the only ancient source of which was the Gujarat Peninsula. The presence of Uruk pottery at Yahya Tepe, the most important caravan city on that road, reveals that city's links with Susa. After about 3000 the so-called Proto-Elamites took over Susa, Godin Tepe, and other sites in Iran...One of the sites, Shahr-i-Sokhte, was located near an important area of tin deposits. With the start of the Bronze Age, tin became a major object of international trade, and Elam controlled its supply for a long time afterward... a long-lasting connection by land and sea was established between lower Mesopotamia and the Indus basin (which the Sumerians and Akkadians called Melukkha)." (Michael C. Astour, 1995, Overland trade routes in ancient Western Asia, in: Jack M. Sasson (ed.), ***Civilizations of the Ancient Near East***, Vol. I, pp. 1401-1420).

If the tin-gold ores have been broken down out of the lodes by weathering, the material is often carried to a stream along with the gangue, usually in gravel or sand-like debris. Often the ores can be obtained by washing, but in some cases crushing is needed to release them.

The washing can be done in a number of ways. Using a pan or similar vessel such as conical bowl-a batea-is one method, or the orestuff can be thrown into running water flowing in some form of trough or inclined plane, often with a prepared surface so that the heavy ore particles settle out of the water apart from the waste. In very dry districts winnowing can be used to make an initial separation.

Tin-copper alloys and archaeological finds

The most important development in the making of bronze was the evolution of the tin-copper alloys. Depending on the tin content, these bronzes provide a wide range of valuable properties, such as hardness, toughness, or ease of casting. To make them requires a deliberate addition of tin to the copper metal. To make a significantly valuable tin-bronze, about five percent of tin is required-more if various specific properties are desired. The tin can be introduced into the copper in

several ways. The simplest method is by “cementation," i.e., adding tin ore of reasonably high grade to molten copper along with charcoal. The most controllable method is to add the tin as metal to the copper.

Tin is not widely distributed and is really a semiprecious metal. Tin hardly ever occurs "native" as metal. Tin ore is virtually always found associated in some way with an "acid"-high silica content-rock. Its only really significant ore is cassiterite (SnO_2), which is normally a dull drab brown material that is difficult to from distinguish ordinary rock unless sensitive methods are used. Cassiterite has two specific properties that are useful for its separation and identification. It is very dense and if crystals of the ore are present it can have a bright sparkle because of its high refractive index. Rich ore holds about 5.0% metal and skilled miners are known to work down to about 0.2% from stream detrital deposits.

Initial stages of the mining and dressing (concentrating) of tin and gold are quite similar. Similar to gold, cassiterite is usually found entrapped in gangue mineral if it is in the original lode containing the ore. A lode occurs like the cheese in a sandwich, where the cheese is the orestuff and the bread on either side the surrounding country rock. The lodestuff has to undergo several treatments. To be worked it must first be mined out, crushed to release the valuable material, and then dressed, usually by using moving water to displace the lighter gangue minerals leaving a rich head of the heavy particles of cassiterite or gold.

(Extracts from the article which originally appeared in The *Oriental Institute News and Notes, No. 146*, Summer 1995, and is made available electronically with the permission of the editor. Tin Smelting at the Oriental Institute, By Bryan Earl, Metals Specialist, and K. Aslihan Yener, Assistant Professor, The Oriental Institute and the Department of Near Eastern Languages and Civilizations The University of Chicago).

[The winnowing etc. processes are reminiscent of the Soma processing described in the R.gveda. See lexemes in the link and interpretation of Soma as electrum by

Kalyanaraman in his forthcoming book (in press): *Indian Alchemy, Soma in the Veda*, Munshiram Manoharlal, Delhi.] "In the ancient Near East... when working gold by streaming, nodules of cassiterite (or tin-stone SnO2) were found. This cassiterite was reduced by workers already proficient in the production of gold, silver and lead. The metal obtained was held to be a kind of lead. [In Sanskrit, the term for lead is: **na_ga**. In Akkadian, the term for tin is: **anakku**]. Lead and antimony were already used to increase the ease with which copper could be cast, but neither of them improved in its other qualities, notably the tensile strength. From trials with the new kind of 'lead', it would be learnt that this mixture was now improved in tensile strength as well as in ease of casting. Nor was it necessary to produce this new metal first; unrefined copper had only to be smelted with charcoal and stream-tin to produce a new kind of 'copper' (ayas in R.gveda), namely bronze, with superior qualities for tools and weapons. At the same time, certain naturally mixed ores were also worked, and were found to give the better kind of 'copper' directly. We have no proof that the tin compound of these mixed ores was ever isolated or recognized. Furthermore, at this early stage the tin content of the bronze could not be adequately controlled, and therefore varied between fairly wide limits." (Adapted from: R.J.Forbes, 1954, Extracting, smelting and alloying, in: Charles Singer, E.J.Holmyard and AR Hall(eds.),1954, *A History of Technology*,ClarendonPress].

Mehrgarh (Jarrige, 1984, Chronology of the Earlier Periods of the Greater Indus as seen from Mehrgarh, Pakistan, in South Asian Archaeology, ed. by B. Allchin, Cambridge, pp. 21-28) in the northern region of Kachhi plains, at the foot of Bolan pass in Baluchistan, has recorded a continuous cultural sequence from neolithic thru chalcolithic (turquoise workshop, 1^{st} half 4^{th} millennium B.C.) to bronze-age cultures, dated from 7^{th}-6^{th} millennium B.C. (a copper bead, sea-shell belt) to 2500 B.C. (spiral-headed copper/bronze pin, one flat axe, one chisel, pipal leaves painted on red ware). Crucibles used for melting copper were found in the first half of the 4^{th} millennium. The dates of Mehrgarh are earlier than the Iranian sites of Tepe Yahya and Tal-i-Iblis, thus recording a paradigm change and ‘a collapse of the earlier Irano-centric view’ of diffusion of chalcolithic cultures from Iran to the

Sindhu-Sarasvati valleys (Asthana, 1985, *Pre-Harappan cultures of India and the Borderlands*, Delhi, Books and Books: 16-82).

Mundigak, near Kandahar in southern Afghanistan has yielded a flat blade, a bronze point or punch with a circular cross-section (6th millennium B.C.); a lance-head, a knife, sickles and chisels, mirrors, double-spiral-headed pins and a buckle (ca. mid-4th millennium B.C.)

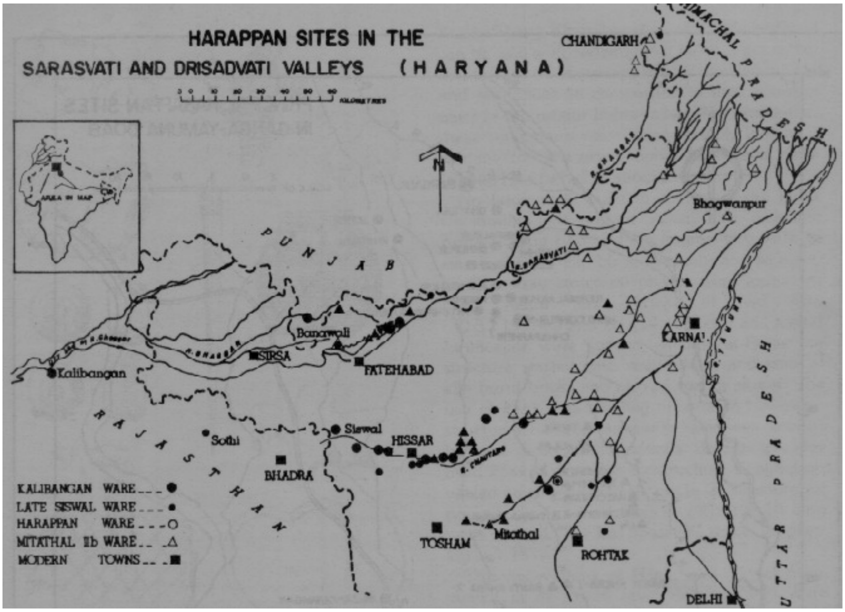
Damb Sada_t, west of Quetta yielded clay seals, copper dagger and knife (3630-2630 B.C.)

Balakot, 88 kms. NW of Karachi yielded copper-bronze objects, native lead and a shell-bangle workshop (mature Harappan phase).

Kot Diji, 25 km. south of Khairpur on the left bank of Indus. Fine axe, chisels of copper, some bronze bangles, knife blades, arrowheads, beads and shell-bangles.

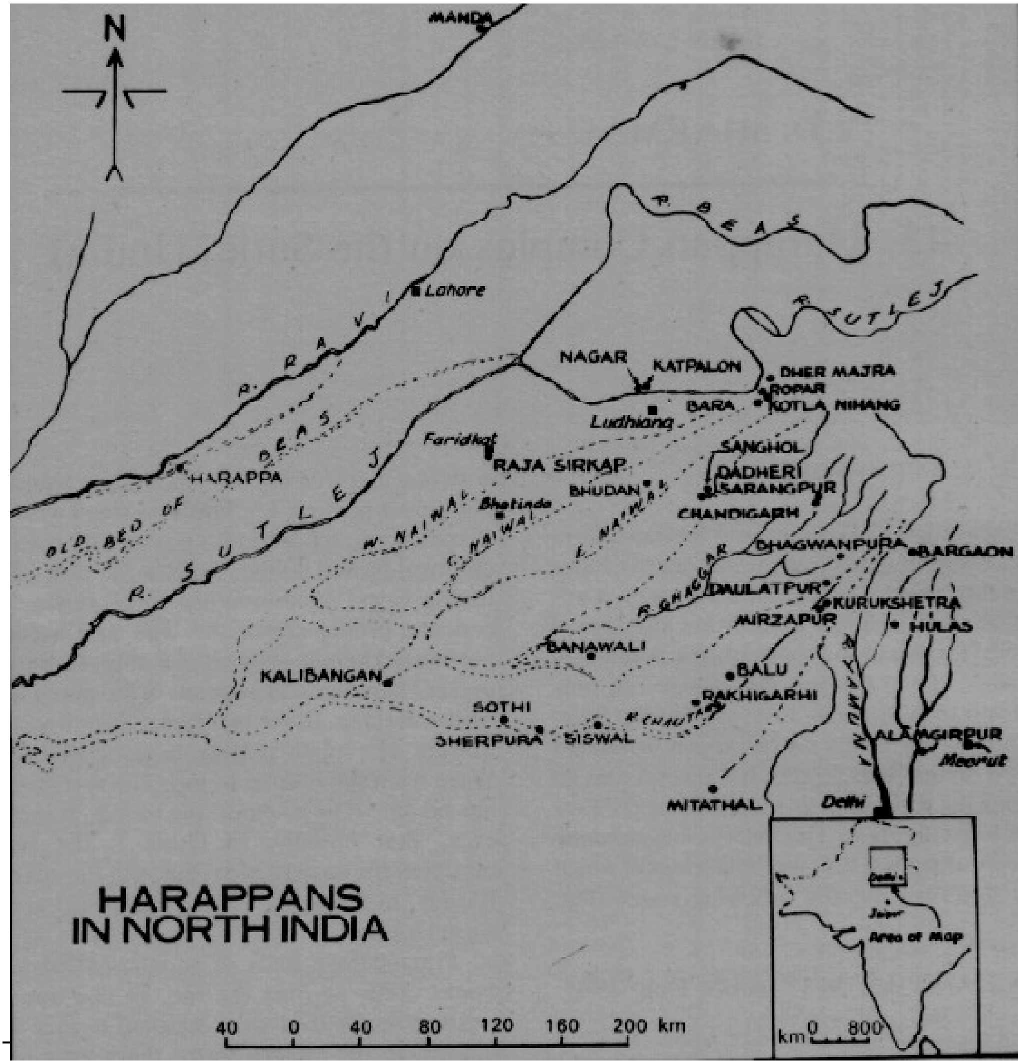
By 3000 BC the use of copper was well known in the Middle East, had extended westward into the Mediterranean area, and was beginning to infiltrate the Neolithic cultures of Europe . It wasn't until approximately 3800 B.C. that bronze was produced in Tepe Yahya, Iran from the accidental blending of copper with other metals. This new mixture exhibited better properties than copper alone. Metal workers quickly found that bronze was more durable and easier to cast than copper. They found it could be bent and reworked back into its original cast shape.

Sothi (Bikaner), on the banks of Sarasvati and Jalilpur, 78 km. SW of Harappa has yielded copper or bronze rods. Sothi is a site in the Dr.s.advati basin and at this site, Kalibangan I pottery (pre-Harappan) was recognized. Kalibangan (ca. 2900 B.C.), on the left bank of the Sarasvati river also recorded Sothi ware and copper bangles, an axe, a paras'u and over 100 copper artefacts. Pre-Harappan levels of Kalibangan have recorded only three copper objects: a curved blade (chopper), a celt and a bangle (Lal,



B.B.,1979, Kalibangan and the Indus Civilization, in: *Essays in Indian protohistory*, ed. D.P. Agrawal and Dilip Chakravorty, Delhi, BR Publishing Corpn, pp. 65-97) Agrawala (1984), however, reports 56 copper objects: antimony rods, rings, wire pieces, lumps, bangles, pins, arrowheads, beads, rods, celts. The Harappan period extended this repertoire to include: hooks, chisels, spearheads, knives, awls, nails, blades, ear-rings, drills, daggers, needles, razors, mirrors, figures of bulls.

Damb Sada_t, west of Quetta yielded clay seals, copper dagger and knife (3630-2630 B.C.)



Balakot, 88 kms. NW of Karachi yielded copper-bronze objects, native lead and a shell-bangle workshop (mature Harappan phase).

Kot Diji, 25 km. south of Khairpur on the left bank of Indus. Fine axe, chisels of copper, some bronze bangles, knife blades, arrowheads, beads and shell-bangles.

These and other Pre-Harappan sites right and left banks of the Indus river (which is the right bank of the River Sarasvati) seem to predicate a Sarasvati-Sindhu-doab-centric view of the evolution, for nearly 5 millennia, of cultural sequences from ca. 8^{th} millennium B.C.

Sites on the Sarasvati River from Bhagwanpura to Sothi to Kalibangan (After K.N.Dikshit, 1984, Fig. 30.2). At Bhagwanpura were found: terracotta bulls, cartg-wheels with central hub, bangles, copper rods and pins, faience beads and bangles and beads of semi-precious stones and bone pins. (K.N.Dikshit, 1984, p. 259).

Suraj Bhan notes that the ‘pre-Harappan’ cultures survived the Harappan period, as seen from the sites like Siswal and Mitathal in the periphery, the eastern Punjab and Haryana. (Suraj Bhan, *Excavations at Mitathal (1968) and Other Explorations in the Sutlej-Yamuna Divide,* Kurukshetra University). After Y.D. Sharma, Harappan Complex on the Sutlej (India), Possehl,. Ed., *Harappan Civilization*, 1982, p. 142. [Note that there are no archaeological sites on the prese4nt courts of the River Sutlej, west of Ropar].

Banawali, 15 km. NW of Fatehabad on the Sarasvati River had a house with several hearths, ovens and fire-pits. There were bangles of copper, shell and faience. Products: arrowhead, bangle, spearhead, sickle blade, razor, chisel, ring, double-spiralled and simple pin, ear/nose ring/fish-hook (R.S. Bisht, 1982, Excavations at Banawali, in: *Harappan Civilization*, ed. G.L. Possehl, Delhi, Oxford and IBH Publishing Co., pp. 113-24).

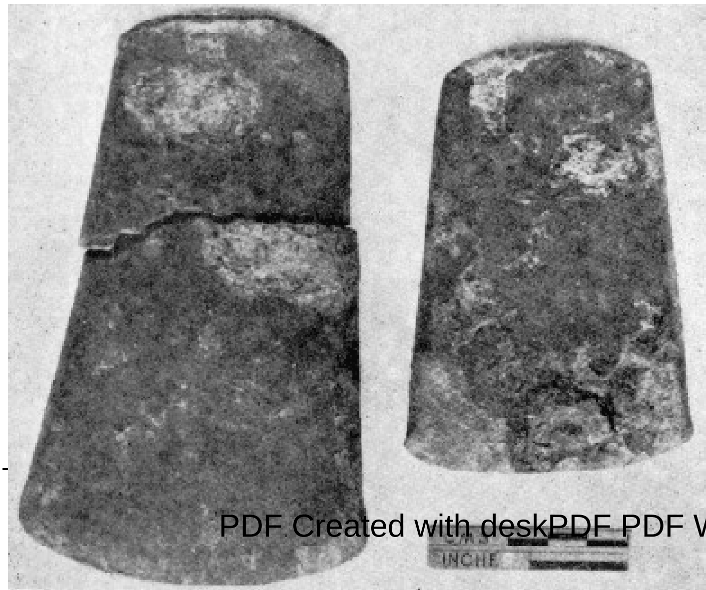
Kalibangan products: celt, hammer, bangle, arrow, fish-hook, axe, paras'u, mirror, pin (B.B. Lal, 1979, Kalibangan and the Indus Civilization, in: Essays in Indian Proto-History, eds. D.P. Agarwal and D.K. Chakrabarti, Delhi, B.R. Publishing Corpn., pp. 65-97).

Gamanwala had an extent of 27.3 ha. and Ganweriwala of 81.5 ha. (almost as large as Mohenjodaro) and were industrial sites on the banks of the Sarasvati River close to the Cholistan desert. Some sites were specifically for melting and fabrication of copper objects. At Siddhuwala Ther, located near Derawar, Sir Aurel Stein had discovered a number of kilns and a copper ingot. (Mughal, M.R., 1982, Karachi, Archaeological Surveys in Bahawalpur, Dept. of Archaeology and Museums, Govt. of Pakistan). The Siddhuwala Ther site also contains numerous kilns.

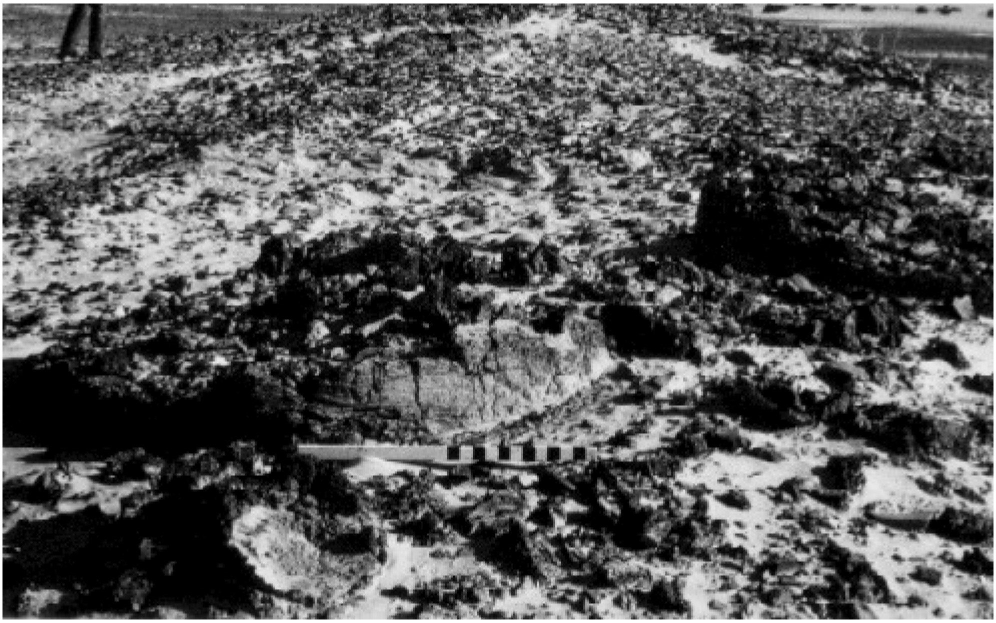
It is remarkable that there is no Harappan site on the Beas river, in contrast with the number of sites located in a row on along the Ravi-Beas doab and along the East Bein tributary which joins the Beas river. Thewse are: Katpalon, Nagar, Harappa. The absence of sites along the present course of the Beas River indicates that the ancient course of Beas was different A number of sites are also found on the Sutlej-Ghaggar doab: Kotla Nihang (30^0 57'N, 76^0 32'E, Dher Majra 39^0 55'N, 70^0 50E, Bara (30^0 17'N, 76^0 47'E), Rupar (30^0 58'N, 76^0 32'E), Sanghol (30^0 45'N, 76^0 20'E), Chandigarh (30^0 40'N, 76^0 50'E), Sarangpur. The location of the Harappan sites in the Sutlej-Ghaggar-Ravi river systems network is likely to provide a guide as to the ancient courses of these rivers.

As seen on the reconstructed course of the ancient Sarasvati river, the Sutlej River had not joined Beas River but had joined the Sarasvati_ river at Shatrana, Punjab. Along this reconstructed course of the Sutlej river from Rupar to Shatrana, the Harappan sites discovered are, from North to South: Dher Majra, Rupar, Kotla Nihang, Bara, Dadheri, Sanghol, Sarangpur. At Kotla Nihang, four small oval kilns or furnaces were found in a row: These kilns are similar to the so-called 'fire altars' found at Kalibangan, and Banawali. A fireplace and kiln wer also discovered at Sanghol. The kiln contained some unbaked pottery and terracotta cakes. [It is noted elsewhere thanks to Mughal's discoveries in Cholistan sites that the terracotta cakes were used to stabilize the objects during intense firing]. At Rupar were found two bronze celts and a small spear head and chert weights in 1a levels. In 1b level were found a spear head, arrow head, bangle, ring, razor blades and chert weights. In a cemetery, a faience bangle was intact on one skeleton; a copper ring on the middle finger was found on another skeleton.(Y.D. Sharma, opcit.) The find of seal, sealing and bronze artifacts at Rupar are significant and will be seen to be interlinked after the process of decipherment of the inscriptions as lists of bronze age metal weapons.

Kalibangan. The site yielded a large number of tools and other objects in copper and bronze: axes, bangles, besides a paras'u_, a tool used even today in Rajasthan to cut the shrubs. A row of sevel 'fire-altars' were found in the citadel of Kalibangan. The altars were sunk into the ground, to a depth of about 25 cm. The sides were plastered with mud. A central cylindrical (sometimes faceted) stele



of clay (sometimes fired) about 30 to 40 cm. high and 10 to 15 cm. dia. in the altar is a characteristic find in many sites. Around the stele lay circular-biconvex 'cakes' of clay; ash and charcoal were also attested. (Mughal had demonstrated that in

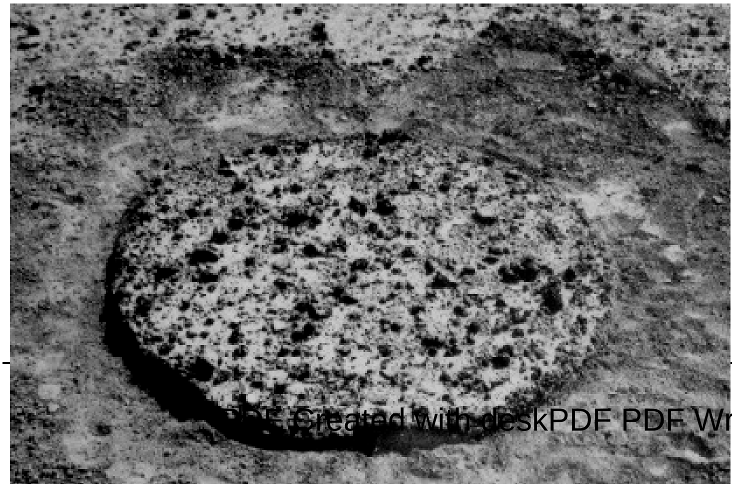


Cholistan sites, the 'cakes' were used to support the pottery being burnt.) The altars were so located that the offerer had to sit facing the east. Embedded into the ground next to the sevel altars was a pot which contained ash and charcoal. A well, bathing pavement and a drain were closeby, indicating the use of water to put out the burning embers after the metallurgical processes were completed. Another platform in the southern part of the citadel yielded a pit, measuring 1.5 m X 1 m and lined with kiln-fired bricks. In this pit, bovine bones and bones of antlers were found. It has been recorded that bones are used to in the process of oxidizing and removing lead from galena to yield silver. To the east of the Lower Town on a small mound, only the remains of fire-altars were found.

Drigwala; Bahawalpur province; numerous kilns on the surface making it an **'industrial site'** (After Mughal, 1997, Pl. 24).

Sharp cutting edge and lenticular section of axes from Kayatha, cast in moulds (After Wakankar 1967). V.S.Wakankar of the Vikram University, Ujjain discovered the site of Kayatha (Dist. Ujjain, M.P). The site is identified with Kapitthaka, the birthplace of Vara_hamihara, the astgronomer. The site is situated on the right bank of the river Chhoti Kali Sindh, a tributary of Kali Sindh, which is a tributary of the Chambal. The place name was given by the first settlers from Sindh. The four cultural sequences discovered were: Kayatha culture (ca. 2000-1800 BC); Banas culture (ca. 1700-1500 BC); Malwa culture (ca. 1500-1200 BC); Sunga-Kushana-Gupta (ca. 200 BC to 600 AD). Also found were a copper chisel and 28 copper bangles, b ead necklaces.

Bhagwanpura is a site on the Sarasvati_ River. Here were found: terracotta figurines, including a humped bull, beads of faience and semiprecious stones, bangles of terracotta and faience and a few pieces of copper. "The excavator reports oval structures of burnt earth, not only from Bhagwanpura, but also from Dadheri, Nagar and Katpalon. The present writer's mind, these are nothing but small kilns or furnaces like those at Kotla Nihang, Bara and Tarkhanwala Dera in District Ganganagar, although the kiln is made of mud bricks at the latter site." (loc cit. Joshi, 1978; Y.D. Sharma, opcit., p. 163).

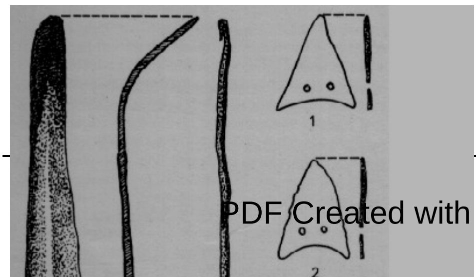


Bisht notes that in Banawali, "one square fireplace contains the Kalibangan earthern cone in the center…there is a house near the 'drain-gate'…a worship room with a fireplace, and a kitchen and several

hearths…its paved sitting room yhielded the well-known ‘tiger’ seal with a short epigraph. In addition, a few other seals were also recovered from this house or from its neighbourhood. A prominent merchant might have been the owner of this house since it has given a rich harvest of seals, wweights, beads, including those of gold, lapis and etched carnelian, besides the de luxe pottery of the age.” (Bisht, Structural Remains at Banawali, in: B.B.Lal and S.P :Gupta, eds., *Frontiers of the Indus Civilization*, 1982, pp. 95-96).

The most compelling evidence for the use of the fireplaces for metalsmithy has come from Banawali. “…noteworthy structure is a partially uncovered house complex with several hearths, ovens and firepits in the room. Excessive fire activity in this area has reddened house floors there. Surely, it should be a workshop, plausibly that of a metalsmith. One more interesting feature is the presence of precisely circular pits, both large and small, neatly cut deep into the house floors. In one case, a pit rim was lined with mud bricks and its walls were thickly plastered. Most of these pits yield fine bluish ash, occasionally mixed with charred grains; although the pits themselves show no sign of firing. These might be the storage silos or bins…A house was generally provided with a room containing a square fireplace, with or without brick lining, but with a longish cone of clay placed in the center…a clay object that gradually tapers upwards from the square base and ultimately turns towards a side terminating into two short, horn-like prongs. It is usually found placed in the center of a hearlth. This object has been found widely distributed at cognate sites. At times, the lower body of a vessel of a roughly staight-sided pottery stand is found to have been placed in a fire pit” (Bisht, 1982, opcit., p. 115-121).

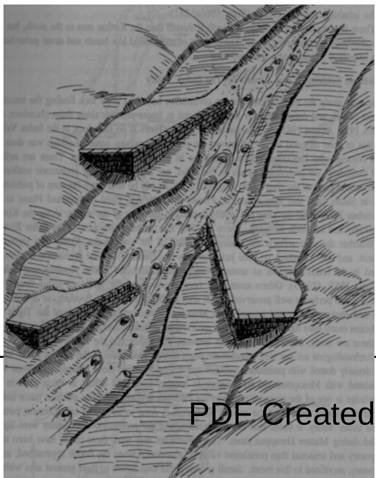
A circular kiln was also found at Wavriwala, Bahawalpur province:



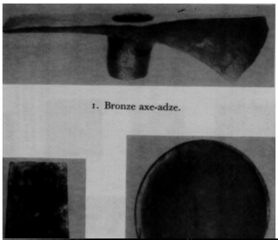
Wavriwala, Bahawalpur province; outline of circular kiln (After Mughal, 1997, Pl. 25).

Fire-workers

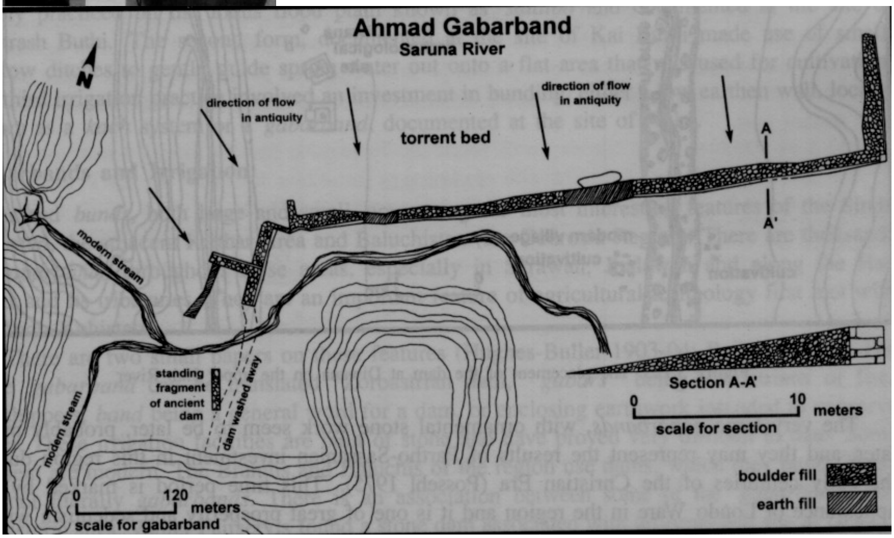
An extraordinary evidence linking the R.gvedic references to the fire-workers echoed as fire-worshippers in the Zoroastrian faith and the emergence of the Bronze Age civilization along the Sarasvati and Sindhu River Basins is provided by the thousands of *gabarbands* constructed on many rivers, most of them perhaps datable to ca. 3500 BC. The importance of the 'fire-workers' in the civilization is enshrined in the term used in Sindh: the *gabarband*. Gabarband means, literally, 'Zoroastrian dam'; gabar = Zoroastrians or fire-worshippers; band = dam or an stone enclosure used to contain or redirect water as an irrigation facility. (For a discussion on the semantics of 'gabar' cf. Balfour, E., 1885, *The Cyclopaedia of India: And of Eastern and Southern Asia, commercial, industrial and scientific*. 3 Vols., 3rd edn. London: Bernard Quaritch). Gabarbands, in thousands, are found in Sindh Kohistan, Kirthar and Baluchistan (Gedrosia) regions. They dominate the riverine courses in Sarawan, Jhalawan and along the Hab River. It is noted that gabarband is an ancient technology and began in thee first half ot the third millennium BC. (Louis Flam, 1981, *The Palaeogeography and Prehistoric Settlement Patterns in Sind, Pakistan (4000-2000 BC).* PhD Dissertation, University of Pennsylvania.



Ahmad Gabarband in the Saruna Valley (After Hughes-Buller 1903-04, Gabarbands in Baluchistan. *Annual Report of the Archaeological Survey of India, 1903-04*: 194-201: Pl. LXI; and Possehl, G.L., 1999, Fig. 3.127). Parthians and Sassanians were also gabars, or fire-worshippers. The L-shaped gabarbands are stone dams built not as full-scale dams but to check and (using the wings of the stone walls to) re-direct the flood waters into the gabarband catchment area, so that alluvium could be build up behind the bands (or dams) creating fertile agricultural fields of upto about two hectares in size.Gabarbands aligned to contain water and to create alluvial tracts (After Possehl, G.L., 1999, Fig. 3.128).



Bronze axe-adze, blade-axe and mirror (After Mackay, *Indus Civilization*,1935, Pl. N.)



Kalibangan. 'Fire altars' on a platform of the 'citadel'. A drain and water-tank are adjacent to this platform. (After B.K. Thapar, 1985, *Recent archaeological discoveries in India*, Paris and Tokyo, 59, fig. 27).





Kalibangan. A fire altar pit with terracotta cakes, is shown with a brick-on-edge kept in the centre. (Plate VIIc, S.P. Gupta, 1996, *The Indus-Sarasvati Civilization*, Delhi, Pratibha Prakashan).

Banawali. Mudbricks surround a firte altar; rectangular rooms are nearby. (Plate VIIIc, S.P. Gupta, 1996, *The Indus-Sarasvati Civilization*, Delhi, Pratibha Prakashan).





Kalibangan. Pit with brick-lining; skeletons of bovine animals. (Plate VIIIc, S.P. Gupta, 1996, *The Indus-Sarasvati Civilization*, , Delhi, Pratibha Prakashan).

Use of animal bones to process electrum

Animal sacrifices are often cited as a part of the ritual. They can also be explained in the context of gold-silver-electrum-quartz metallurgy. Bones and ground-up potsherds in a cupel absorb the lead oxide during the process of cupellation, to leave behind the pure precious metal. (cf. Also the later-day tradition of as'vamedha).

Bones have been used since ancient times in the process of separating silver from lead in the galena ore.

"Two steps are involved in producing silver from lead ores. Lead ore is melted first under the appropriate reducing and/or oxidizing conditions to produce metallic lead. Silver is then extracted from the lead by cupellation by which the lead is oxidised to litharge (lead oxide), leaving behind the silver. For this the lead is heated under strongly oxidizing conditions in a cupel. The lead oxide so formed is absorbed in the porous material of bone or ground-up potsherds in the cupel, leaving silver metal behind. This process may be repeated several times to purify the silver; it is very efficient in freeing silver from such common impurities as copper, antimony, arsenic, tin, iron, zinc (less well for bismuth), in the argentiferous lead." (R.J. Forbes, in: Singer et al., *A history of Technology*, 1954, pp. 573-587).

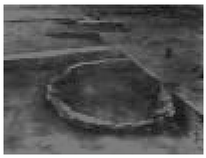
The Kalibangan finds are described: “The ‘altar’s were in fact clay-lined pits, each measuring about 75X55 cm. Within each pit were noted ash, charcoal and the remains of a clay stele as well as of what are known as terracotta cakes. Of the last-names item, complete examples were found in some of the ‘fire-altars’ in the residential houses of the Lower Town. The clay stele, as seen from the relatively more intact examples in the Lower Town, stood vertically up, was either cylindrical or slightly faceted, and measured about 30-40 cm in height and 10-15 cm. In diameter. It would even appear that it occupied the focal position in the complex…on a platform were noted not only a well and a ‘fire-altar’, but something more: it was a rectangular pit, measuring 1.25 x 1 m and lined with kiln-burnt bricks. Within it lay bovine bones and antlers, evidently representing some kind of a sacrifice…” (B.B. Lal, Structural Remains at Kalibangan, in: B.B.Lal and S.P :Gupta, eds., *Frontiers of the Indus Civilization*, 1984, pp. 57).

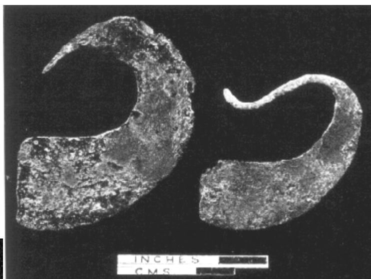




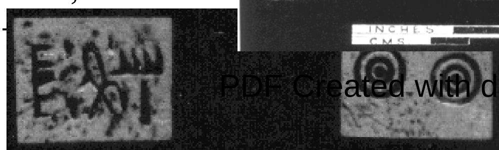
Rupar: bronze jar in situ in Ia level

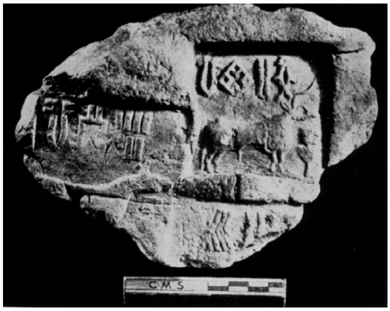
Kalibangan: well in the courtyard of a lower town house.





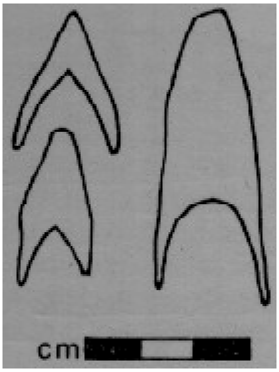
Kotla Nihang (30.57N, 76.32E), 2 kms. SE of Rupar on Shatadru (Sutlej) river; oval fire kilns in a row; fragments of terracotta bangles were picked up from the kilns; Sharma, Y.D., 1982, Pl. 13.1





Rupar: Bronze razor blades from 1b levels.
Rupar: bronze implements Ia and Ib levels

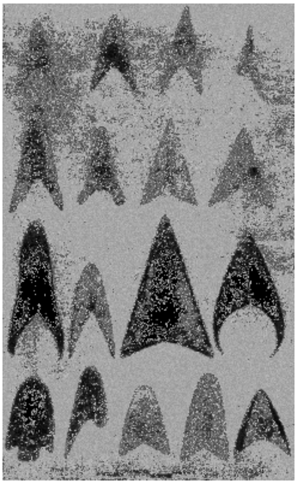
Rupar: two steatite seals [cf. notes elsewhere deciphering the inscriptions with glyphs as lists of bronze weapons].



Rupar: Baked clay sealing with impression of 3 seals [cf. notes on decipherment of script, the inscriptions were lists of metallic weapons; the seals were used to authrenticate the traded packages containing the weapons]. Ganeshwar (37^0 40'N 75^0 51-30'E)-Jodhpura (27^0 31N 76^0 5'ECulture of the Pre-Harappan period is dated to ca. 2700-2800 B.C. Ganeshwar is close to Mitathal (near Bhiwani, Haryana), and about 250 km.s from Kalibangan; Kantli river had its source near Ganeshwar and the river constituted the transport link to Kalibangan, since the ancient course of the river had joined Dris.advati somewhere near Nohar-Sothi-Bhadra in Ganganagar District, Rajasthan.. About 1000 copper objects: arrow heads,

rings, bangles, spear heads, chisels, balls, celts were found at these sites. The copper is sourced from the local mines and Sikar-Jhunjhunu copper deposits of the Khetri belt. The thin blades, arrow heads and fish hooks are characteristic of the Harappan sites… A round terracotta cake was also found at Ganeshwar (an apparent link with the Harappan artifact).. Copper arrowheads were analyzed and found to contain: copper 96.5%%, silver 0.3%, arsenic 1%, lead 0.03%, tin 0.2%, nickel 0.04$, zinc 0.25%, iron 0.2%."…the copper objects from Kalibangan, 1200 in number, seem to have been manufactured and supplied by the people of the Ganeshwar-Khetri region. The Khetri copper mines are hardly 60 kms. from Ganeshwar…The name of a small village Kulhade-ka-Johad (Pond of Axes) near

Ganeshwar bears testimony to the survival of a tradition of axe (kulhada) manufacture in the region. The indentation on these objects were made with pointed copper drills which have been found at Ganeshwar…Sabania, District Bikaner. Two long copper celts from this site, with Indus script, are now preserved in the Gurukul Museum at Jhajjar (Haryana)…".(R.C.Agrawala and Vijay Kumar, 1982, Ganeshwar-Jodhpura Culture, in: Gregory L. Possehl, ed., *Harappan Civilization*, p.124-131).

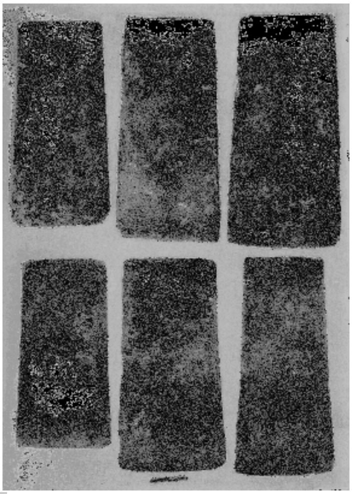


Arrow heads from Banawali (Rajasthan). The larger example resembles those from Ganeshwar. (After R.C.Agrawala and Vijay Kumar, 1982, Ganeshwar-Jodhpura Culture, in: Gregory L. Possehl, ed., *Harappan Civilization*, Fig. 11.2)

Copper objects from Bagor, District Bhilwara (Rajasthan), Period II (2800-2000 BC); the arrow heads from Ganeshwar did not have a perforation for hafting. A few copper arrow heads of the Ganeshwar type were found at Kalibangan, Lothal, Harappa, Mohenjodaro and Chanhudaro (Marshall 1931; Pl. CXLII, no.13; Mackay



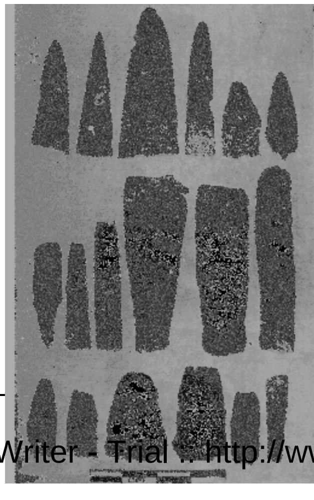
1938, Pls. CXXI, CXXVII, CXXXIII; Vats 1940: 383-384, Pl. CXXV, nos. 13-14). At Ganeshwar 400 arrowheads of this type were found. About 20 each were found at Mohenjodaro and Harappa. After R.C.Agrawala and Vijay Kumar, 1982, Ganeshwar-Jodhpura Culture, in: Gregory L. Possehl, ed., *Harappan Civilization*, Fig. 11.3)



Ganeshwar: copper arrow heads with wood shaft marks, 3rd millennium BC (After R.C.Agrawala and Vijay Kumar, 1982, Ganeshwar-Jodhpura Culture, in: Gregory L. Possehl, ed., *Harappan Civilization*, Pl. 11.1)







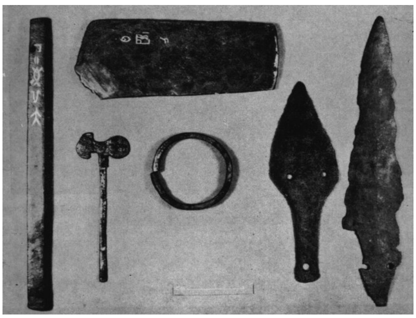
Ganeshwar: copper blades, knives and spear heads, 3rd millennium BC (After R.C.Agrawala and Vijay Kumar, 1982, Ganeshwar-Jodhpura Culture, in: Gregory L. Possehl, ed., *Harappan Civilization*, Pl. 11.1)

Ganeshwar: copper fish hooks, 34d millennium BC (After R.C.Agrawala and Vijay Kumar, 1982, Ganeshwar-Jodhpura Culture, in: Gregory L. Possehl, ed., *Harappan Civilization*, Pl. 11.1)

Copper celts with various indentations, e.g. 3 X3 dots, 4 X 3 dots..(After R.C.Agrawala and Vijay Kumar, 1982, Ganeshwar-Jodhpura Culture, in: Gregory L. Possehl, ed., *Harappan Civilization*, Pl. 11.1)

Ganeshwar: copper rods, chisels and a drill (After R.C.Agrawala and Vijay Kumar, 1982, Ganeshwar-Jodhpura Culture, in: Gregory L. Possehl, ed., *Harappan Civilization*, Pl. 11.1)

Kalibangan: copper objectsw from Mature Harappan levels, comparable to the finds from Ganeshwar (After R.C.Agrawala and Vijay Kumar, 1982, Ganeshwar-Jodhpura Culture, in: Gregory L. Possehl, ed., *Harappan Civilization*, Pl. 11.1)



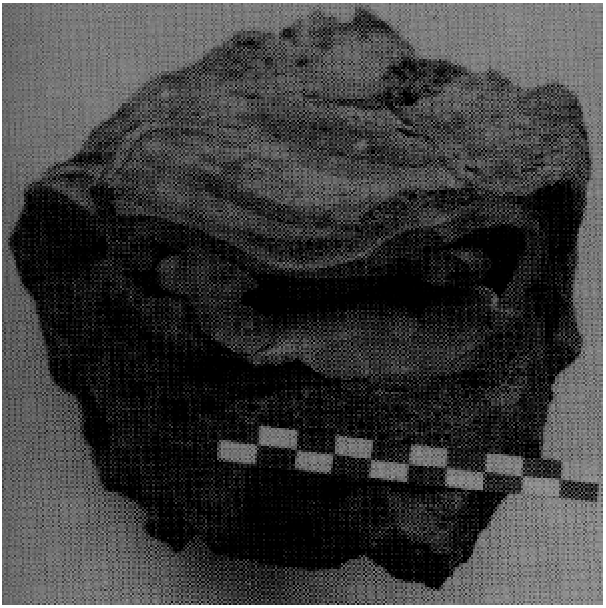
Lothal had an exclusive coppersmiths' quarter (2300-2000 B.C.) (Sr Rao, Lothal, Vols. I and II, Delhi, ASI, 1979 and 1985). Lothal is between the Rann of Cambay (khambat) and Little Rann of Kutch, close to the Nal lake, about 52 miles from Ahmedabad and 4 miles from Bhurki. The ancient mound is between Bhogava and Sabarmati rivers. Bronze (low-tin) was used for pins, mirrors, rods, chisels, flat axes, daggers and arrowheads; bronze (high-tin) was used for bangles and pins. Lead was used to harden tools with sharp edges. Tin became a rarity in Sumer by 2700 B.C. until it could be obtained again by 1500 B.C.Sayce cites that

tablets from Kara Huyuk refer to tin which was a rare and precious metal in Babylon ca. 2500-2200 B.C. Of the 71 objects from Lothal examined by Lal, only 8 objects contained tin: the tin content of two bangles were 11.2 to 11.82 percent. A grooved rod had 9.02 percent, a mirror 5.47 percent, a pin 13.80 percent, two chisels 9.02 to 9.62 percent, an engraver 3.96 percent, a spear 2.27 percent. Lothal metal-workers knew the art of forging bronze. The manufactured objects found: axes with long narrow blade or broad blade; spearhead, arrowhead, razor, chisels, dagger head, mirror awls and needles, nails and rods, fish-hooks and saw. Personal ornaments of copper and bronze: bangle, ring, ear-ornament, beads. Figurines: bull, hare, dog, bird, fowl. Jar, mirror, spoon, chair were also fabricated. Copper ingots of plano-convex shape (99.81 percent purity) were also found. The ingots from Susa also have a concave under-surface and short projections. Perhaps some copper was imported and remelted in clay crucibles (Rao, 520-21). A coppersmith's workshop was discovered. One furnace was circular with a rectangular projection to supply fuel. A second furnace (House 154) had a muffle. A kiln yielded ash and fragments of terracotta crucibles and a stone mould used for casting pins and awls. A copper pin, a broken copper chisel and a hammer stone with a socket for hafting are finds from the vicinity of this workshop. A sample of cementation brass (1500 B.C.) from Dwaraka has also been reported. Electrum was used for making gold pendants (Rao, 664-65). Kolar gold-fields yield electrum. At the smiths' workshops were found clay tablets containing impressions from the Harappan seals. (These are further analyzed in this website).

The presence of zinc in a Lothal arteact (2200-1500 B.C.) (No. 4189) assayed: 70.7 percent copper; 6.04 zinc; 0.9 Fe, 6.04 acid-soluble component (probably carbonate, a product of atmospheric corrosion). The zinc and other components could have come from the Ahar-Zawar area, Rajasthan. The next dated brass artefacts are: from the Gordian tomb in Phrygia of the eigth and seventury B.C. and Etruscan bronze of the fifth century B.C. containing 11 percent zinc.

Chanhudaro produced seals, beads and weights. Chanhudaro is on the right bank of the River Hakra-Nara-Mihran. Chanhudaro is 12 miles away from the left bank

of the Indus, near Jamal-Kirio (Nawabshah District, Sind). Mound II yielded in four hoards, a large quantity of tools and implements, of copper and bronze. Unfinished castings and ingots were discovered in some of the hoards, indicating a metal-workers' quarter. Objects: copper jar cover, scale-pans and beams, bronze blade axes, saw, spearhead, daggers, small knives, rajors, arrow-heads, bronze fish-hook, copper and bronze awls, rods, bronze stave-heads and plumb-bob. Ornaments were: bracelets, pendants, rings and pins in coper and bronze only (CE, 190). One ingot was bronze formed by pouring the molten metal into a vertical hole in the ground. A second ingot has a flat top and a rounded base. Small blocks of lead were also found (CE, 187-88). In room 215 a concreted mass of minute steatite beads was found. There were also three copper or bronze knives, a copper pin, a steatite seal, a flake drill, a faience gamesman, a shell object and some carnelian nodules. Courtyard 297 produced a large pan with copper and bronze tools, an ingot of bronze, a copper chisel, bangles and razors (CE, 43).



Bronze smithy, lapidary and stoneware bangles

View of the slag with the coated sub-cylindrical bowl enclosing the stoneware bangles in a pile, in central position, Mohenjodaro. Reconstruction of the

stoneware bangles' firing apparatus; stoneware bracelets are piled up in five pairs and enclosed in a coated carinated jar. The jar is given red-slipped, chaff-tempered outer coating. The apparatus is mounted on a network of supporting terracotta bangles. A unicorn seal impression is affixed on the upper capping. (Massimo Vidale, in:Jansen and Urban, 1987, pp. 109-111)

Signs 403-407 are shaped like a pair of bangles



Balakot, Stoneware bangle and fragments (Blk-6, Parpola)
The bangle has an inscription in red, using two signs:

Bronze in Mohenjodaro

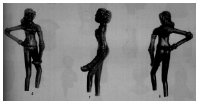
Tin has always been found as an alloy with copper in almost all the sites of the civilization during the mature-Harappan phase. The percentage of tin in bronze averages from 6 to 13 percent (*MIC*, I, 30).

Metallurgy of Copper axe. "In terms of Brinell hardness, the axe of Mohenjodaro was 85 close to the cutting edge (the figure is much above that of mild steel), decreasing to 63 towards the middle of the blade. HCH Carpenter of the Royal School of Mines suggested that it is possible that the ancient axes do not retain

their original hardness; it is also possible that such an axe was once harder. Mackay concludes from the examination of the rejected castings that the axes of Mohenjodaro were cast very much in the same shape as the finished specimen that we have found, even to the curved cutting edge; these would therefore have required not only hammering to shape them, but also possibly a great deal of hardening." (*FEM*, 594-95; A.K.Biswas, *Minerals and Metals in Ancient India*, Delhi, DK Printworld, 1994).

An exquisite example of bronze sculpture in the civilization is this statue from Mohenjodaro attesting to the competence of the metallurgists of this major trading centre of the Sarasvati-Sindhu doab. The bronze-smith is an artist who shows the statue wearing a hair-bun, bangles from wrist to shoulder and a necklace, Mohenjodaro. (After Marshall, Pl. XCIV).





Copper-bronze artefacts from Mohenjodaro exhibited at the Mohenjodaro museum (Dr. Abdul Jabbar Junejo and Mohammad Qasim Bughio, 1988, *Cultural Heritage of Sind, International Arabi Conference*, University of Sind, Hyderabad, Sindhi Adabi Board); out of 13 artefacts analysed. 6 were found to contain between 4.51% to 13.21% tin; the artefacts were: bronze rod, bronze button, bronze chisel, bronze slab, bronze chisel and bronze lump.

Mohenjodaro was an island between the Indus and the Western Nara loop (27.19N 68.8E). Bronze was used for weapons requiring sharp edges and for figurines or ornaments with fine finish. Another alloy of copper was found: arsenic averaging 3 to 4.5 percent in content. The arsenic component might have come from the copper ore itself or using another arsenic-containing mineral such as lollingite (MIC, I, 31). Weapons of war were: axes, spears, daggers, bows and arrows, maces, slings. No evidence of

shields, helmets, or swords were found. Two types of blade-axes were: lay and narrow, short and broad.

By the Early Dynasty III period, the Mesopotamian craftsmen had mastered the techniques for working copper, lead, silver, gold and tin. The Royal Cemetery at Ur has yielded a corpus of metal work where true tin bronze is found, apart from the common arsenical bronze and precious metals: gold, silver and electrum. Metal blades were produced in many sizes to serve as arrows, spears, daggers. Also found are sickles and hoes. Axes come in many shapes and sizes, some cast and some hammered with the tang beaten round a haft (See the drawing of a Sumerian soldier carrying spear and axe.) (Crawford, H., p. 133). Muhly (1983) quotes a passage from the late third millennium Laws of Eshnunna that a workman issued with tools for the harvest must return the same weight of metal at the end of the season, even if some of it is scrap. This is an indication that temples had metalsmithies where metal could be melted down and recast. **Simug** was the metalsmith.

In the Ur III period, the royal mausoleum of Shulgi at Ur yielded scraps of gold leaf which seem to have been part of architectural decoration, as was the case in the Jemdat Nasr period where the altar of the Eye temple at Tell Brak was decorated with gold leaf. The texts state that large numbers of metal-workers were employed by both the temple and the palace to produce a whole range of goods from tools to jewellery. These workers at Ur worked in groups under a foreman who reported to a general overseer. An assay office issued the metals to the foreman and weighed the finished article before counter-signing the receipts issued by the general overseer. In provincial towns, the governor himself issued metal from the treasury. Private metal merchants handled the supply of raw materials. (Mallowan 1947; Crawford, op.cit., p. 134).

Objects of copper: hook, axe, sword, knife, spearhead, pan, dish, chisel, vase, scale pan, bangle, canister, awl, saw, lance-head, razor, cones, dagger, ring, spoon, reamer, kohl-stick, sickle, casting, broken ingot, scale beam, fish-hook, copper

lump, needle. Copper vessels were made in two parts and joined together by running on and rivetting techniques. (Soldering was used for gold and silver).

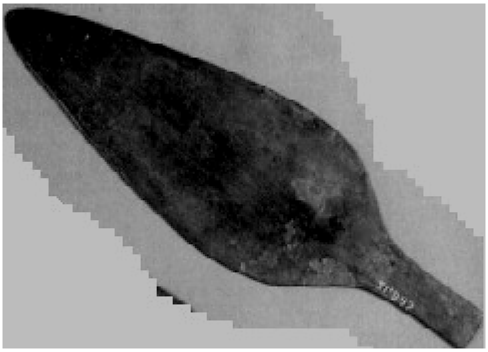
Objects of bronze: spearhead, mirror, vase, axe, pan, saw, chisel, dagger, axe-adze, fish-hook, scale pans, ornament, spacer, hook, knife, kohl-pot (*FEM*, 441-94). Short broad axes of copper and bronze, copper leather cuter, bronze razor and saw, bronze fish-hook were also found by Marshall (MIC, II, 488-508). Both bronze and copper were used as spacers and terminals for bead-necklaces. Gold and electrum were in use, in a significant measure with the possibility that cupellation was used to extract silver from its ores (perhaps argentiferous galena). Edwin Pascoe suggests that in ancient times, lead was extensively mined in various parts of India, chiefly to extract the silver associated with it. Hamid's analysis of samples of silver proved the presence of lead, thus enhancing the possibility that silver used in Mohenjodaro was an extract from an ore, perhaps galena rich in silver. (MIC, II, 524). Lead (with silver) was also available in the Fa_ranja_l mine in the Ghorband Valley of Afghanistan.

Marshall found in HR area, House VII an oval-shaped, 7 ft. long pottery kiln with a narrow mouth, surrounded by a thin wall of a single course of burnt bricks. A few betel-leaf-shaped clay plaques were found near the mouth of the furnace. A kiln in VS area, House VII had a circular shape and dia 6 ft. srrounded by a wall of a single course of bricks. This was possibly a pottery kiln (MIC, II, 226). DK mound, G section had six kilns, this mound was perhaps the artisans' quarter (perhaps potters). A number of copper melts found near House VI of Block 2 point to metallurgists at work. House VI, Room 51 yielded copper ore and a small piece of lead in a brick-kilned pit. Lead was perhaps used to assist smelt copper (FEM, 41). SW wing, room 33 produced two kilns, both 4ft. 3 in. deep and paved with brick, with a 4 in. ledge. The kilns were used to fire at high temperatures using wood or charcoal. (FEM, 49-50). At courts 21 and 26 two kilns had floor at a level of 3.5 ft, perforated with a number of holes for the heat of the fire to penetrate to the pottery. These holes were arranged in a ring round the edge of the floor with one hold in the centre. (FEM, 102). Mackay believed that G section DK kilns were to bake pottery

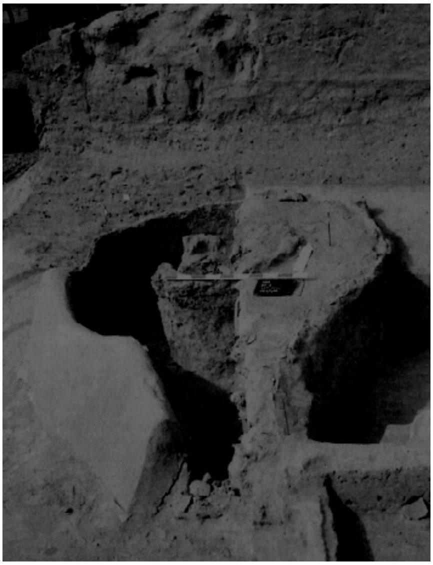
but those in the 'palace' might have been used by an armourer in the making and repair of weapons and tools, which recall the armourer's shop in the palace ta Kish. Copper ore came from Jaipur state in Rajputana, the Shah Maqsud in Southern Afghanistan and Robat in the extreme west of Baluchistan (MIC, II, 676). Lead was available from Afghanistan, Baluchistan, Rajputana and Hazaribagh. Tin content of 4.5-13.2 percent indicate the use of high grade bronze. Another proof is the completely oxidized state of a substantial core of white stannic oxide enveloped in a layer of red cuprous oxide in many objects. Bronze was used for tools, razors, jewellery (MIC, II, 481-83). It is likely that the discovery of bronze occured in North Persia. It is noted that daggers and knives discovered in the Mohenjodaro civilization resemble some weapons found at Susa, Anau and in SW Caspian areas (MIC, II, 483-84). Bronze statues (e.g. the dancing girl statue, animal figurines) were cast bronze perhaps using cire perdue process and also direct casting in a mould (FEM, 283-84, MIC, I, 345).

Armourer, writer: kut.ha_ru, the bra_hman.i bull

Stone seals or steatite seals and bosses on them were first cut into shape by a saw, whose thickness was 0.025 in. (Faience was used for amulets, animal figurines, balls and marbles, beads, button, finger rings, bracelets, head ornaments, seals, studs, vessels and weights.) The rounding off of the boss was perhaps done with a knife and finished off with an abrasive. A hole was bored through the boss from opposite sides. (MIC, II, 377). The Harappan seals found at Kish, Mesopotamia had traes of oroginal blue or green colouring, indicating the use of glazing techniques. Herbert Beck concluded that the surface of the seal was painted with some alkali and then subjected to heat (FEM, 346). Marshall felt that the vitreous paste on faience objects was an Indian invention and was applied to faience. Glaze as mixed with a siliceous powder and manganiferous haematite or red ochre as pigments, and fired at high temperature; the paste resembled glass in some respects.



Harappa: Copper/bronze dagger with tapering blade and long tang; sharpened along one edge and both edges at the tip; this dagger was found inside the copper jar no. 277 which also contained other tools and weapons, thought to be the hoard of a copper merchant. (Harappa 277.02; 17.9 cm long, 4.5 cm. Wide; Karachi National Museum, NMP 54.271; Vats, M.S., 1949, 87, pl. CXXIII,30).



Harappa: Large updraft kiln, of the Harappan period (ca. 2400 BC) discovered , in a segregated area of the city, during 1989 on Mound E. (After J.M. Kenoyer, 1998, Fig. 8.8) Harappa had a number of furnaces. Harappa is loated at the confluence of two sukhra_va_s (dry beds of the Ravi river), 15 miles WSW of Montgomery town. Copper objects found: a two-wheeled copper chariot, copper antimony rod stopper, copper mace-head, copper beads, ornaments. A large hoard of copper and bronze implements was found in a copper jar No. 277, Mound F: one hundred weapons, implements, utensils both finished and unfinished, cast bars, lance-head, bangles, thick sheet of copper with hammer marks (EH, 470-73). In 48 samples examined, the percentage of arsenic (harita_l) ranged from .3 to 7 percent); the percentage of tin ranged from 1 to 14 percent. Rajputana mines contain As (Arsenic) and Ni (Nickel) . Sources of tin were Hazaribagh, Bihar and Mesopotamia. A simple tin solder of its alloy with lead and soldering of silver and gold were used. In Mound F, 16 furnaces have been

discovered: (a) part of round pottery jar; (b) cylindrical pits dug in the ground with or without brick lining; © pear-shaped pits dug in the ground with or without brick lining. Jar-furnace filed with charcoal fuel is still in use by goldsmiths in the region. Some furnaces were found with ashes and quantities of vitrified slag. In many furnaces, there is a small rectangular pillar or sometimes a wall set at the back and an air passage for the circulation of heat between itself and the back wall.

Harappa: copper jar no. 277 with high neck and flaring rim, which contained the hoard of bronze/copper weapons and tools; the jar was made by hammering a sheet of copper and raising the hollow base and rim separately; the two pieces were joined by cold hammering at the ledge; 16.5 cm high, 21 cm. Maximum dia.; Harappa No. 277. 13.303B; Karachi, National Museum. NMP 52.324; Vats, M.S., 1940, 85, 384, pl. CXXIV. 27.28; After J. M. Kenoyer, 1998, cat. No. 197, Fig. 8.21).
Jar No. 277 and contents of the jar, Harappa (After Vats, Pl. CXXI). cf. Pl. CXXIV, 27 and 28 showing the copper jar No. 277 which contained a hundred objects.

Copper jar No. 277 contained these objects; the figure also shows a marble macehead no. 573 (After Vats, Pl. CXXIII) Thirteen blade-axes with or without shoulders (Nos. 1-13), eight long and narrow axes (Nos. 14-21), two double-axes (Nos. 22 and 23), eleven daggers with tapering sides (Nos. 24-32 and 64-64), one mace-head (No.33), thirteen spear-heads and flaying knives (Nos. 35-47), one lance-head (No.66), one arrow-head (No.63), one chopper (No.67), two saws (Nos. 61 and 62), ten chisels with or without shanks (Nos. 49-58)J, two cast bars for making chisels (Nos. 59 and 60), and a flat strip (No.48).

Copper and bronze weapons, implements and utensils (After Vats, Pl. CXXII). No. 24 carinated copper jar; No.32 shallow inverted dish; No. 26 round copper vase 6 in. dia; No.30 deep cup with flared mouth; No. 31 saucer with slightly incurved rim; No.29 ring-stand for jar. No.13 adze; No.19 adze inscribed with three faint

pictograms; 5.15 in. long, 2.15 in. broad at the cutting edge; No.18 lower part of a broken axe. No. 17 razor.

Copper and bronze ornaments, utensils, implements, weapons, Harappa (After Vats, Pl. CXXIV). A stilus (No.19), a beam of a weighing scale (No.14), a semi-oval, hollow terminal (No.20), five solid bangles (Nos. 1,2,3,5 and 7), a rod intended to be fashioned into a solid bangle (No.4), three hollow bangles (Nos.11-13), two flattened leaves to be made into hollow bangles (Nos. 8 and 9; Nos. 6 and 10), four thick rectangular copper pieces (Nos. 15-18), a thin bowl with tapering sides (No.23), two large folded sheets of copper (Nos. 24 and 25), two thick broken pieces bearing prominent hammer marks (Nos. 21), a lump of lollingite (used to extract arsenic used for hardening the cutting edges of tools instead of the tin alloy). No.29 is an oval copper mirror. No.44 a copper hook. Nos. 42 and 43 caste bronze latches (?)

The Bronze-age triangle: Sarasvati-Sindhu doab, Ancient Iran and Mesopotamia

Sarasvati Sindhu civilization is one side of the triangle linking with the central Asian and Mesopotamian civilization areas. The Sarasvati-Sindhu doab can be viewed as the base of the right-angled triangle, the hypoteneuse being the land-route across Baluchistan and the third side the maritime route through the Persian Gulf to Mesopotamia.

The jury is still out on the issues related to dating the bronze-age artefacts in the three contiguous areas: India, Iran, Mesopotamia/Anatolia and Crete.

In the Metropolitan Museum of Art is the bronze sword of King Adad-nirari I, a unique example from the palace of one of the early kings of the period (14th-13th century BC) during which Assyria first began to play a prominent part in Mesopotamian history.

The Ancient Iranian bronze industry was also influenced by Mesopotamia. Luristan, near the western border of Persia (Iran), is the source of many bronzes that have been dated from 1500 to 500 BC and include chariot or harness fittings, rein rings, elaborate horse bits, and various decorative rings, as well as weapons, personal ornaments, different types of cult objects, and a number of household vessels.

A sword, found in the palace of Mallia and dated to the Middle Minoan period (2000-1600 BC), is an example of the extraordinary skill of the Cretan metalworker in casting bronze. The hilt of the sword is of gold-plated ivory and crystal. A dagger blade found in the Lasithi plain, dating about 1800 BC (Metropolitan Museum of Art), is the earliest known predecessor of ornamented dagger blades from Mycenae. It is engraved with two spirited scenes: a fight between two bulls and a man spearing a boar. Somewhat later (c. 1400 BC) are a series of splendid blades from mainland Greece, which must be attributed to Cretan craftsmen, with ornament in relief, incised, or inlaid with varicoloured metals, gold, silver, and niello. The most elaborate inlays--pictures of men hunting lions and of cats hunting birds--are on daggers from the shaft graves of Mycenae, Nilotic scenes showing Egyptian influence. The bronze was oxidized to a blackish-brown tint; the gold inlays were hammered in and polished and the details then engraved on them. The gold was in two colours, a deeper red being obtained by an admixture of copper; and there was a sparing use of neillo.

The equation of the word *sindhu* with muslin in ancient Babylonian list of clothes is significant.

D.K. Chakrabarti (1979, The problem of tin in early India--a preliminary survey, in: ***Man and Environment***, Vol. 3, pp. 61-74) opines that during the pre-Harappan and Harappan periods, the main supply of tin was from the western regions: Khorasan and the area between Bukhara and Samarkand. The ancient tin mines in the Kara Dagh District in NW Iran and in the modern Afghan-Iranian Seistan could have been possible sources. Harappan metal-smiths used to conserve tin by storing

and re-using scrap pieces of bronze, making low-tin alloys and substituting tin by arsenic. It is possible that some of the imported tin (like lapis lazuli) was exported to Mesopotamia. A cylinder seal of Gudea of Lagash (2143-2124 B.C.) read: "copper, tin, blocks of lapis lazuli-- bright carnelian from the land of Meluhha." (Muhly, J.D., 1976, ***Copper and Tin***, Hamden, Archon Books, pp. 306-7). Trapu is tin in the Atharva Veda (11, 8.7-8: s'ya_mamayah asya ma_m.sa_ni lohitamasya lohitam; trapu bhasma haritam varn.ah pus.karamasya gandhah) and van:ga is also tin with the possible association of chalcolithic cultures in Bengal (2nd millennium B.C.) with possible links with the culture of Thailand of the same period (Solheim, W.C., ***Sciece***, Vol. 157, p. 896). Hegde suggests the possibility that water-concentrated placer deposits referred to as 'stream tin' in the proximity of Aravalli and Chota Nagpur Hills might have also been the sources of tin.

> In the inscription of Cylinder A, Gudea describes his involvement with craftsmen: "the ruler sat with the silversmiths building Erinnu with precious stones, he sat with the jewelers building with copper and tin Ninturkalamma (goddess) directed before him the craftsmen and metal casters (Jacobsen 1987: 408). Neo-Assyrian ruler Sennacherib also shows his interest in metalworking: in one inscription he claims innovation in casting colossal metal statues (cf. Dalley 1988: 103-5); in another inscription, a reference is made to the alloy used for casting ornamental metal friezes for gates (cf. Walker 1988: 116).

S. R. Rao (1979, 1985: Lothal report) noted that Mohenjodaro copper and Rajasthan ore contained arsenic while the copper artefacts of Lothal were remarkably arsenic-free. The possible inferences are: Mohenjodaro artisans used copper obtained from sources other than Rajasthan to add arsenic; Lothal artisans might have used copper imported from Oman; Lothal artisans knew the techniques (evident in later-day Ahar) of roasting copper ore to remove arsenic.

Arsenic alloying preceded tin alloying in West Asia. Tin alloys started in Iran only during the third millennium B.C. Lollingite ($FeAs_2$) samples were found in Nal (Southern Baluchistan). It is likely that arsenic might have been used both as hardener of copper and as a deoxidiser. Lead was used as a flux.

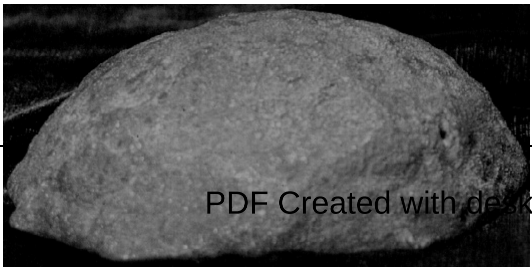
S.R. Rao further notes: "The fact that bar-celts and chisels and flat rectangular axes (celts) were as popular in the Copper Hoard and the Indus Valley Cultures should not be overlooked. By 1900 B.C. the Harappans had already evolved at Lothal the crescentic sleeved axe which is associated with the Copper Hoard people and resembles the Bisauli anthropomorphic figure (S.R.Rao, 1973, ***Lothal and the Indus Civilization***, Bombay, Asia Publishing House, 183-84). Copper Hoard Culture (1100-800 B.C.) is characterized by antennae sword, anthropomorph and the harpon, celts, axe-blades, socked axes and knowledge of closed casting method (similar to the methods of the Harappans).

KTM Hegde and Ericson, J.E., 1985, Ancient Indian Copper Smelting Furnaces, in: *Furnaces and Smelting Technology in Antiquity*, ed. P.T. Craddock, Occasional Paper No. 48, British Museum, London, pp. 59-67: The survey covered six ancient copper ore mining and smelting sites in the Aravalli (Arbuda) hills extending over a thousand kms.: Khetri and Kho Dariba in NE, Kankaria and Piplawas in the Central part and Ambaji in SW.. A large majority of mine-pits measure 7-8 metres in dia. and 3-4 metres deep showing evidence of fire-treating of the host rocks on the mine walls to widen rock joints. The evidene indicated probable mining in the chalcolithic period. Timber supports recovered from a gallery at a depth of 120 metres at Rajpura-Dariba mines in Udaipur District were radio-carbon dated to 3120+_ 160 years before the present (1987). This correlates with the zinc-containing copper artefacts of Atran~jikhera. Finely crushed ore was concentrated by gravity separation at the smelting sites which were invariably close to the banks of hill streams. This helped separate gangue from the ore. Smelting charge was by crushed quartz equal to the weight of the ore, crushed charcoal twice the weight of the ore. Furnace walls showed evidence of residues of small, hand-made, fistfuls of

spherical lumps. The smelter furnace was a small, crucible-shaped, clay-walled, slag-tapping device worked on forced draught from bellows; 'this simple furnace appears to have been continuously used in India over the millennia without little innovation.' It would appear that the facilities in the metropolis of the civilization on the banks of Sarasvati and Sindhu were only purification and fabrication facilities with limited or no smelting operations. Bun-shaped copper ingots from Ganeshwar taken through the riverine routes were perhaps carried by itinerant metal-smiths of the copper-hoard culture and fabricated in cities like Mohenjodaro and Harappa to meet the specifications of the consumers of this doab or the Tigris-Euphrates doab.

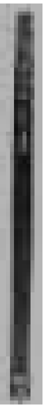
Many coppersmiths and blacksmiths, perhaps gypsies of ancient times, were itinerant during the historical periods in Kutch, Gujarat. "Of the classes who in ordinary seasons move about the province, the chief are, of artisans, carpenters, blacksmiths, coppersmiths, masons and weavers who with little capital go from town to town offering their services or selling their wares; of carriers, Hairs with their bullock carts, Charans, Lohanas, and Memans with their pack bullocks, potters with their asses, Sindhis with their camels; and of the lower classes, shepherds, Ods, or wandering diggers, cotton cleaners, and laborers, especially field laborers in harvest time. Of immigrants, polishers, blacksmiths, knwn as Gadalias, and Ods, come from Marwar and return within the year; and in the cold and hot seasons traders from Cabul and coppersmiths from Kathiawar come and sell their fruit and brass vessels, and return before the rains set in." (Govt. of Bombay, 1880, *Cutch, Palanpur, Mahi Kantha*, Bombay, Govt. Central Press, Gazetteer of the Bombay Presidency, Vol. 5: 103).

Prospecting for mineral ores



Lothal: bun-shaped copper ingot (After S.R. Rao, 1991, pl. LXIII).

"... circular bun-shaped ingots found on third- to second-millennium sites in Oman (Hauptmann et al. 1988: 41, fig. 4:6), which indicate that this was the shape in which at leastsome Omani copper was traded in the Near East at this time. It may, however, have been the standard for many other source zones. A group of five circular bun-shaped ingots of copper were included in the mid-third-millennium BC 'Vase a la Cachette' excavated at Susa. They have been associated with ingots of this shape found in the Gulf and in Indus Valley settlements (Tallon 1987: nos. 687-92, pls. 262-4). Two bun-shaped ingots were found in a contemporary context at Tell Chuera in Syria (Moortgat and Moortgat-Correns 1978: 66ff., fig. 29a-b).(Moorey, 1994, opcit, p. 244).



The inverted U sign also occurs on one side of Kalibangan k121A and B inscribed bronze rod. The text may be read as 8302 Mahadevan. [Note that the 'fish' sign is perhaps analogous to the 'fish' pictograph on the incised gold pendant. The incised rod ma be read as property lists, including two copper bun-shaped ingots.]

It is hypothesized that the inverted U signs which occur inscribed on copper weapons are hieroglyphs and may denote this bun-shaped copper ingot. When occurring in a sequence, in multiples, this inverted U sign may connote the particular number of such ingots possessed by the owner.

Kenoyer provides a lucid reconstruction of the possible sourcing and use of minerals for the Harappan metallurgy: " Smelting of copper ore took place in the distant highland mining regions of Baluchistan, the mountains of Rajasthan, or even far-off Oman. Traders or nomads would have brought the distinctive bun-shaped ingots of smelted copper, along with tin, lead and other metals to the skilled metal workers in the city workshops. Given the fumes, smoke and fire associated with metal processing, many of the metal workshops were probably located along the edges of the settlement or in separate craft villages such as Chanhudaro, wshere copperworking and lapidary arts were practiced alongside ceramic production, shellworking and possibly even sealmaking. Crude copper (derived directly from smelting and rich in sulphur) or refined copper was used to make a variety of tools and ornaments used in the cities, while copper alloyed with arsenic or tin was produced for specific objects. Arsenical copper makes extremely hard-edged tools, such as saws or chisels, but the edges were slightly more brittle than those of tin bronzes. By measuring the depth of saw cuts on shell manufacturing waste from Mohenjodaro and Harappa, we can determine that hardened bronze saws were as effective as the traditional steel saws still used by shellworkers in Bengal. Although the addition of tin can be used to make copper harder, the main objective may have been for producing distinctive colours. Slight amounts produce a golden hue, while large amounts lend a silver tint...the Indus metalsmiths did not maintain a uniform standard for alloying. However, it is also possible that part of the variation in alloy percentages may result from indiscriminate recycling, where objects with different percentages of tin or arsenic alloy were combined to make a new object...One copper hoard from Harappa consisted of a large cooking pot covered by a bronze plate. Inside the pot were numerous copper weapons and tools; four axes with strqaight edges, eight shouldered axes, eight long and narrow blade axes, two unfinished double axes, two daggers with long tangs and tips curved back, seven tapered daggers , one marble mace head, thirteen spear heads, ten chisels, two thick bars, two saws, one arrowhead, one double-edged dagger, one lance head, one semi-oval chopper and one small bowl. Careful examination of the tools indicates that some of them were brand new and unused, others old and worn out from

repeated sharpening.(Vats, M.S., *Excavations at Harappa*, Delhi, Government of India Press, 1940, 85, 384).”(J.M. Kenoyer, 1998, p. 158).

Ca. 1015 B.C., King Solomon and King Hiram of Tyre sent ships sailing directly from the Arabian port to India, touching 'Ophir', Sophir or Sauvira in the Gulf of Khambat (near Lothal) and brought back gold, silver, ivory and peacocks.

Homeric times refer to tin along with ivory coming from India (V. Ball, 1880, A geologist's contribution to the History of Ancient India, in: ***Journal of Royal Geological Society of Ireland***, Vol. 5, Part 3, 1879-89, Edinburgh, pp. 215-63). Ball reiterates Lassen's comment that the Greek word kassiteros was derived from kastira whereas Bevan feels (E.J. Rapson ed., 1921, ***The Cambridge History of India***, Vol. I, Delhi, Indian Edn., S. Chand and Co., p. 351) that kastira was derived from kassiteros. Such a controversy also existed about a_raku_t.a in Sanskrit and oreichalkos in Greek ('mountain copper') which refer to brass. Pliny called this aurichalcum or golden copper (since brass is yellow))(Pliny, ***Naturalis Historia***, 34.2 and 37.44).

The native origin of the Harappan civilization is suggested considering the existence of the Sothi culture in the northernmost tip of Rajasthan, which areose well before the urban phase of the civilization. Ghosh postulated a homogenous cultural area in Gujarat, Rajasthan, Sind, Punjab and Baluchistan and called it Sothi culture, a proto-Harappan culture, a body which accepted the urban idea, and an actual prototype of the mature Harappan. Ghosh’s observations on the Sothi pottery: The occurrence is noted of Sothi-type ware in deeper levels of Mohenjodaro and some Sothi pottery elements in the Harappan levels of Kalibangana and Rupar. “The Sothi ware of Kalibangan is found to be analogous with the pre-defence (periano Ghundai) pottery of Harappa and also with that of the earlier (pre-Harappan) period of Kot Diji…Some of the designs…are comparable with those on the Kili Gul Mohammad were (semi-circles in horizontals with the intervening areas cross-hatched). Quetta ware (cross-hatched triangles, opposed

triangles, double row of needles and fish), Jangal Coarse (radiating lines ending in solid discs) and painted (scales) ware and Sur Jangal III (opposed triangles); analogies with Mehi, Nundara are also too considerable to be overlooked.” Ghosh goes on to argue that the similarities with Sothi ware across an extensive area need not be accidental and that at the base of the Harappan culture lay “a firm Sothi substratum.“ (A.Ghosh, 1965, The Indus Civilization: its origins, authors, extent and chronology, in: *Indian Prehistory, 1964*, V.N. Misra and M.S. Mate, eds., Deccan College, Poona, 113-156). S.P. Gupta’s views extend this further and sees the reorganization of the proto-Harappan culture in the old Sarasvati valley, influencing the contemporary cultures of other regions and thus, creating the Harappan culture. Gupta notes that the original home of the Civilization was the Sarasvati_Ghaggar basin and not the Indus. (S..P. Gupta, Origin of the form of Harappan Culture: A new perspective, *Puratattva*, No. 8, 141-46).

Aristoboulos who was deputed by Alexander (326 BC) on an expedition, ‘found an abandoned country, with more than a thousand towns and villages deserted after the Indus had changed its course’. (Strabo XV, 1,19). [A correction is necessary. Please read, ‘Sarasvati’ in lieu of ‘Indus’. It was the River Sarasvati and its tributary the River Sutlej which had changed their courses]. Bra_hman.a texts refer to ancient ruins (arma, armaka) found along the banks of the Sarasvati_ (Pancavims’a Bra_hman.a 25,10,16-18), Dr.s.advati_ (La_t.ya_yana S’rauta Su_tra 10,19,4-9) and Sindhu (Jaimini_ya Bra_hman.a 3,238). La_t.ya_yana S’rauta Su_tra (10,19,9) states: “He should proceed along the right bank of the Dr.s.advati_; having reached the ruined site near its source, and having sacrificed there with this sacrifice he should go down to the Yamuna_, at Triplaks.a_vaharan.a for his concluding ceremonial bath.” The prabhavya arma, the ruined site at the source of Dr.s.advati_, is apparently located in the north-east (say, with reference to Marusthali_).

The offerings at arma’s are very significant since they are comparable to the offerings to Pitr.s. During Balarama’s pilgrimage, most of the pilgrimage sites visited by him are ancient sites which had hermitages of ancient r.s.is or sages. If

Dr.s.advati_ was an ancient tributary of Sarasvati_ and if its source was close to Yamunotri as the La_t.ya_yana S'rautasu_tra (10,19,9) seems to indicate, the ruined mound referred to may not be too far from Plaks.apras'ravan.a, the legendary place of origin of Sarasvati_ river.

Taittiri_ya Bra_hman.a (2.4.6.7-8) refers to the deserted ruins which were earlier cities:

> **Na hi spas'am avindan anyam asma_t**
> **Vais'va_nara_s pura eta_ram agneh**
> **Athemamanthan amr.tam amu_rah**
> **Vais'va_naram ks.etraji_tya_ya deva_h**
> **Yes.a_mime pu_rve arma_sa a_san**
> **Ayu_pa_h sadma vibhr.ta_ puru_n.i**
> **Vais'va_nara tvaya_ te nutta_h**
> **Pr.thivi_manya_mabhitasthur jana_sah** (Rajendra Mitra, ed., *Bibliotheca Indica*).

'Of yore there was no other spy (messenger--?of Varun.a) except Vais'va_nara Agni to discover this. Then the indestructible (?) devas stirred up the immortal Vais'va_nara for the conquest of territory. The people to whom these ruined mounds (sites), lacking posts, formerly belonged, these settlements, widely distributed, O Vais'va_nara, having been expelled by thee, have migrated to another land'.

In the context of the purus.amedha, a symbolic offering of professional representatives, in lieu of the as'vamedha, the Yajus. 30.11 refers to 'armebhyo hastipam java_ya_s'vam pr.s.t.yai gopa_lam vi_rya_ya_vipa_lam' which is interpreted as: for ruined mounds, the elephant-keeper, for speed, the horse-keeper, for nourishment, the cowherd, for manliness a shepherd'.

In RV 10.133.1,3, a reference is made to vailastha_na which may be comparable to a vila, or a pit used to her elephants (cf. the khed.d.a operations to capture wild elephants using huge pits). There is a possibility that some of the arma's (ruined mounds), as in Rupar, are close to areas of tectonic fault-zones which have deep pits. This may perhaps explain the reference to an elephant-keeper in relation to arma. Alternatively, the use of the elephant-keeper may have been to remove the broken walls and other ruins to make the land habitable again.

Monier-Williams' lexicon suggests that the root for kastira was ka_ns (to shine). There is a possibility that the root might have yielded kan:sa_ which means bronze or copper-tin alloy. (AV, 10.10.5: s'atam. kan:sa_h indicating the possible use of the metal as an exchange unit). **[Note: daks.a was kan according to the Maha_bha_rata; kan means copper in Tamil; kam.sa = bronze (Skt.)].**

The decipherment of the Sarasvati-Sindhu inscriptions will establish what the Harappans gave in exchange for the materials such as tin and lapis lazuli/turquoise imported from Sumer and Persia-- weapons or tools of copper and bronze and possibly movable goods such as cotton textiles and various types of beads.

The soldiers advanced protected by armour to avoid injury:

> **tapanti s'atrum svarn.a bhu_ma_ maha_sena_so amebhires.a_m** (RV 7.34.19)

...Our heroes, winged with horses, come together. Let our car warriors, Indra, be triumphant (RV 7.83.1-3).

The terms related to arms and armaments primarily in the R.gveda are:

> a_la_kta_ ayomukham is.u (RV. 6.75.15): reference to poison and metal-tipped arrow. [cf. Kon:kan.i. itsu, itsa_ (var. vitsu, possibly linked with

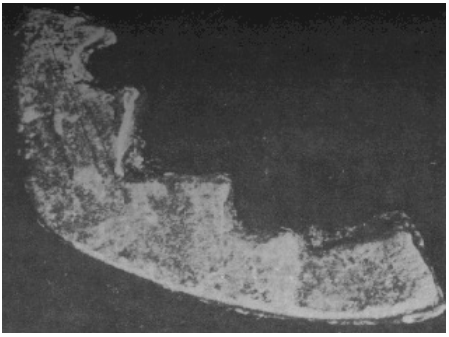
vr.s'cikam) = scorpion; note the two scorpions used on one side of an ivory seal in Rehmandheri; the obverse of the seal has two antelopes].
brahman.aspatireta_ sam. karma_ra iva_dhamat
deva_na_m. pu_rvye yuge asatah sadaja_yata (RV. 10.72.2): reference to metalsmith who blows in a furnace and makes metal objects.
Words related to minerals, smithy, weapons and metals in the R.gveda:
atas = combustible material, firewood (RV. 1.58.2, 4; 2.4.7; 3.7.3; 4.4.4; 4.7.10; 10.89.5)
ayas = metal (copper-bronze)(RV. 1.57.3; 1.163.9; 4.2.17; 6.3.5; 6.47.10; 6.75.12; 10.53.9-10)
ayasmaya = pitcher (RV. 5.30.15)
ayodam.s.t.ra = fire that bites metal (RV. 1.88.5; 10.87.2)
a_yasi_ = metallic (RV. 1.116.15; 1.118.8; 7.3.7; 7.15.14; 7.95.1; jan:gha_ a_yasi_m = artificial metallic leg for vis'pala_ (RV. 1.116.15; 1.118.8); also used to qualify city, fort.
pura a_yasi_ = city, building, fort, body-metallic (RV. 1.58.8; 2.20.8; 4.27.1)
a_ha_va = metallic pitcher; later, Pa_n.ini defines as cattle-feeding water vessel (RV. 1.34.8)

ara_ = spoke (RV 5.58.5; 10.78.4)

In a paper read before the Philos. Soc., Glasgow, 'The High Antiquity if Iron and Steel', and printed in Iron (1875-76), John V. Day, who was in charge of iron works in Southern India, notes **a_r** or **a_ra** as the oldest Sanskrit name for iron, meaning the planet Mars (Ares) or Saturn; iron (oxide of iron, iron-stone?) brass (copper?) (cf. Richard Burton, 1884, *The Book of the Sword*, New York, Dover Publications Inc. repr. 1987, p. 108). Cf. a_ra = brass, oxide of iron; a_raku_t.a brass (Ka. lex.)

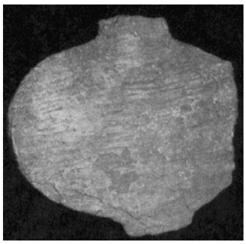
a_ra_ shoemaker's awl (RV); awl (Pali.Pkt.); arcu_c needle (Ash.); a_u shoemaker's awl (K.); a_ra (S.); a_r (L.P.) awl, point of a goad (P.) a_ro

awl (N.); a_l sharp point, spur (A.); a_ra_ awl (B.); a_ra, a_ri (Or.); a_r, aria_, arua_, araua_ spike at the end of a driving stick (Bi.); arua_, a_r cobbler's awl (Mth.); a_ri_ awl, goad; a_ri_ awl; aria_ goad; **a_ra_ shoemaker's awl or knife** (H.); a_r pointed iron spike (G.); a_ri_, ari_ cobbler's awl (M.)(CDIAL 1313). kana_r bamboo goad for young elephants (Mth.)(CDIAL 3025) ka_n.d.i_ra armed with arrows (Pa_n.); archer (Skt.); kani_ra_ a caste usu. o arrow-makers (H.)(CDIAL 3026). [kana_r = ka_n.da + a_ra_]



Lothal: circular saw (bronze)(ASI)

bhrama = drill (RV 6.6.4: adha bhramasta urviya_ vibha_ti ya_tayama_no adhi sanu pr.s'neh). Buruma which is used even today derives from this term. Drill s of metal are found (Mackay, E.J.H.,1976 (1943), Chanhudaro Excavations, 1935-36, New Delhi, pp. 475, 588, 597, 661). Drills made of stone were also found (ibid., p. 595). The drills were tubular (ibid.,pp. 323, 661), centrebit (ibid., p. 661).



"The most interesting tool...is the saw (Pls. CXVI,6 CXVIII,1) whose teeth and adjoining part of the blade are set alternately from side to side, an arrangement previously not known earlier than Roman times." (Mackay, 1938, p. 442). The drill was used to make fine perforations in beads. "Probably the thick end of this tool was inserted in a wooden handle and it was worked with a bow." (Mackay, 1938, p. 475; Pl. CXXXI,6; CXXXII,10). A reamer was used to enlarge holes. "Reamer (Pl. CXXIV,6) fines down to a point at one end...A tool of this kind

would be very useful for enlarging holes; ample purchase for the fingers is afforded by its comparatively broad end.” (Mackay, 1938, p. 475).

cakra = wheel (RV 1.30.19; 2.11.20; 4.1.3)
a_n.i = pin of axle (RV 1.35.6; 63.3; 5.43.8)
aks.a = axle (RV 10.53.7)
The axle and pin were made of s’im.s’apa (*dalbergia sissoo*) and khadira (*acacia catechu*) woods respectively (RV 3.53.19).

Lothal: sleeved axe (copper/bronze) (ASI)

tamba = pitcher, metallic poitcher ayastamba (RV. 5.30.15); cf. TA-BI-RA in substrate Sumerian meaning 'merchant'.

trivis.t.i dha_tu = alloy (RV 1.102.8)

nis.ka = gold ornamental pieces to decorate the neck (RV. 2.33.10); may also mean gold coins (RV. 1.126.2; 4.37.4; 5.27.2), alludes to goldsmith (RV. 8.47.15)
nis.kagri_va = golden necklace (RV. 5.19.3)

pavitra = purifier or strainer (of soma)(RV. 1.28.9; 3.36.7; 8.33.1; 8.101.9)

pa_s.ya = stone (RV. 1.56.6)

bhurija = carpenter's tool to make chariot (RV. 4.2.14; 8.4.16; 9.71.5)
rajata = silver (RV. 8.25.22)
rayim = wealth (RV. 1.73.1; 1.159.5; 2.21.6; 3.1.19; 4.2.7; 4.34.10; 4.36.9; 5.33.6; 6.6.7; 6.31.1); ra_ya = treasure or wealth (RV. 8.4.15-16) Is rayim derived from rajata = silver?
rasa = liquid essence, extract, juice (RV. 1.23.23; 1.187.4-5; 5.43.4; 6.44.21)

ra_dhas = wealth (RV. 1.9.5; 1.17.7; 2.13.13; 2.22.3; 4.32.21; 5.13.6; 5.38.1). In 5.52.17 ra_dha_ is connected with yamuna_, the wealth of cattle and horses in the valley of the yamuna_: yamuna_ya_madhi s'rutamudra_dho gavyam mr.je ni ra_dho as'vam mr.je
rukma_ = chest ornament (made of gold)(RV. 1.166.10; 2.34.2 and 8; 5.53.4; 5.54.1; 5.55.1; 5.57.5; 8.46.33; 9.15.5: vaks.ahsu rukma_)

swadha_ = ornament (RV. 4.10.6)

hiran.ya = gold (RV. 1.22.5; 1.33.8; 1.43.5; 1.122.2; 1.162.16; 2.33.9; 3.34.9; 4.17.11; 9.112.2) hiran.yasyeva kalas'am = golden pitcher (RV. 1.117.12); hiran.ya karn.a = one with golden ear ornament or ring (RV. 122.14); ghr.tam na pu_tam tanuh...s'uci hiran.yam, tatte rukmo na rocata svadha_vah = fire, your appearance is like purified clarified butter and pure golden ornaments (RV. 4.10.6).
hiran.yavartani = golden way or river whose bank-sands contain alluvial gold particles (RV. 6.61.7; 8.26.18; 10.75.8)

vajra = thunder. spear. harpoon to be thrown or barbed harpoon for fighting (RV. 1.33.2; 1.51.7; 6.23.4)

ku_t.a = hammer (RV 10.102.4; AV 8.8.16). drughn.a = wooden hammer (RV 10.102.9; AV 7.28.1). ghana = hammer ghaneva vis’vak vijahi ara_vn.ah (RV 1.36.16); ghaneva vajrin snathihyamitra_n (RV 1.63.5); vibhvatas.t.am ghanam (RV 3.49.1); ghana = mace (RV 10.134.6) ghan = hard (weapon(RV. 1.8.3; 1.33.4)

vis'pala_ (RV. 1.116.15: jan:gha_m a_yasi_m vis'pala_yai = the lady with metallic leg)(RV. 1.112.10; 1.117.11; 1.118.8; 10.39.8)

ves'i_ = needle (RV. 7.18.17) su_ci = needle for sewing (RV. 2.32.4: ra_ka_maham suhava_m..si_vyatvapah su_cya_cchidyama_naya_ dada_tu = let the Goddess Ra_ka_ sew with needle our destination (a baby).

s'ara = arrow (RV. 1.148.4; 10.125.6; 10.178.3); sharpened arrow = s'arva_ s'is'a_nah (RV. 10.87.6); s'arya, s'arya_ = arrow (RV. 1.119.10)
s'aru = arrow (RV. 1.100.18; 1.172.2; 1.186.9; 4.28.3; 10.87.6; 10.125.6); in 2.12.10 it may mean a spear.

s'una_si_rau = plough (si_ra_) and its tip (phala_)(RV. 4.57.5 and 8); si_ra_ = plough (RV. 10.101.3-4); same meaning in Pa_n.ini (6.2.187)
vr.ka = plough (RV. 1.117.21)(RV. 8.22.6= yavam vr.ken.a kars.a_thah)
la_n:gala - plough (RV. 4.57.5 s'unam kr.n.atu la_n:galam = let the plough cultivate well) pha_la = plough (RV. 4.57.8; 10.117.7)

khanitra = spade or digging tool (RV 7.49.2; RV. 1.179.6: khanama_nah khanitraih = by the digging spade).
khanitrima = that which is obtained by digging (RV. 7.49.2: sravanti khanitrima_ = flowing canal obtained by digging).
abhri = spade (RV 1.179.6)

sr.n.i = sickle (RV 1.58.4; 4.20.5; 10.106.6). sr.n.i_ = sickle (RV. 10.101.3 = it sr.vyah pakkameya_t = let sickles fall on the ripe harvest) da_tra = sickle (for cutting crops such as barley)(RV. 8.78.10); Pa_n.ini calls this serrated sickle or crooked knife (3.2.182, 8.4.52)

A sickle has been discovered at Mohenjodaro. (Mackay, 1938, pp. 471, 509; Pl. CXXVIII,7; CXXXI, 14). “The definite edge on the inside of the curve and its blunt outer margin point to this being a toothless sickle.”

an:ki, sr.n.i = tools used to pluck fruits from trees (RV 3.45.4; 1.58.4; 10.101.3; 106.6)

ayomukha = copper-/bronze-headed (RV 6.75.15)
a_yudh = weapon (RV 2.14.5; 3.44.4; 5.63.4)
r.s.t.i = javelin (RV. 1.37.1; 1.64.4; 1.166.4; 1.169.3; 5.54.11; 5.57.2; 8.20.11) r.s.t.i = lightning, a weapon like tomara (RV 1.85.9; 5.34.2; 6.17.10)r.s.t.i: a_sr.ukmaira_ yudha_ nara r.s.va_ r.s.t.i_h assr.aks.ata (RV. 5.52.6): javelin thunder spear

bhr.s.t.i = spike (RV 1.162.11); sahasrabhr.s.ti = thousand-spiked (RV 1.52.15; 56.3)
tri-kakup = three-pointed club (RV 1.121.4)

pr.thupars'u = broad-axe-wielder (RV 1.129.8) va_s'ibhih taks.at as'manmayi_bhih = hand-axes, made of stone too (RV 10.101.10) (RV 7.83.1)
"The short,broad type...The lunate edges of this type of axes are considerably more splayed than in Type I...Their faces as a rule are slightly convex and like the Type I blades they were first cast, then hammered and finished off with some abrasive. The edges always have a double slope and the butt is square cut and thinner than the rest of the blade." (Mackay, 1938, p. 456).

tigita = sharp/shapened (RV 2.30.9); tigma ani_ka = sharp pointed (RV 1.95.2); tigmamu_rdha = sharp headed (RV 6.46.11); tigma jambha = sharp teethed (RV 1.79.6; 4.5.4); tejah = sharp edged (RV 1.71.8; 6.3.5)

tigmes.u = possessing sharp arrows (RV 10.84.1) ba_n.a = arrow (reed)(RV 6.75.17)
mr.gadanta, rurus'i_rs.n.i = horn-tipped (RV 6.75.11; RV 6.75.15); sr.n:ga = end-point of arrow (AV 4.6.5); kulmala = end point of arrow in which the head was fixed (AV 4.6.5); da_dhi_ca = bone-headed (RV 1.84.13; Indra defeats Vr.tra using the bones of Dadhi_ci.)

rambhin.i = shaft of a spear (RV 1.168.3) an:kus’a = driving hook, goad (RV 8.17.10; 10.34.7; 44.9); as.t.ra_ = goad (RV 4.57.4; 6.58.5)

s’is’a_na = sharpening (RV 8.60.13; 9.5.2; 10.87.1); diha_na = whetting (RV 10.87.4) nis’ita = sharpened, pierced (RV 4.24.8; 6.2.5)

s’akti = spear (RV 1.167.3; 5.54.11); s’aktivant = armed with lance (RV
pavi = spear sharpened; javelin, sabbala (RV. 10.180.2: pavim tignam: sr.kam sam.s’a_ya pavimindra tigmam vi s’atru_n ta_l.ih); am.ses.vetah pavis.u ks.ura adhi (RV 1.166.10); pavyeva rajannaghas’am.samajara (RV 6.8.5).

sa_yaka = arrow (RV. 2.33.10; 10.48.4) s’ara = projectile arrow (RV 1.191.3; 6.75.16; 8.70.14); is.u = arrow (RV 1.184.3; 6.75.5; 8.77.7); is.ukr.t, is.udhi = quiver (RV 1.184.3; RV 6.75.5); nis.an:gin.ah = wearing quiver (RV 3.30.15; 5.57.2); is.ubala_ = archer division (RV 6.75.9); jya_ = bowstring (RV 4.27.3; 6.75.3; 14)
dhanu = bow (RV 6.75.2; 8.72.4; 9.99.1); a_rtni = end of a bow where the string is fastened (RV 6.75.4)
is.u = arrow (RV. 1.13.4; 1.64.10; 2.24.8; 5.57.2; 8.7.4); a_la_kta_ ayomukham is.u = poison and metal-tipped arrow (RV. 6.75.15); cf. Pa_n.ini 6.2.107

s’aru = missile, spear (RV 12.172.2; 7.71.1; 8.18.11);
heti = weapon (RV. 1.103.3; 1.121.10; 3.30.17; 6.62.9). heti = a missile (RV 2.33.14; 3.30.17); as’ani = a bolt, a missile (RV 1.54.4; 3.30.16); as’mahanm = lithic missile (RV 7.104.5); jurn.i = a fiery weapon (RV 1.127.10).
s’u_la = long and sharp pointed spear (RV 5.322.10; 7.3.9) s'u_la = metal spike (RV. 1.162.11)
sr.ka = spear or harpoon to be thrown (RV. 1.32.12; 10.180.2); sr.kam sams'a_ya = shapened spear (RV. 10.180.2)

sena_ = army (RV 1.66.4; 2.33.11; 5.30.9); sena_ni_ = commander (RV 7.20.5; 9.96.1) devasena_ = army of gods (RV 10.103.8)
s’ata_ni_ka = having a hundred forms or arrays (RV 8.49.2)

varman = protective shield, breast armour (RV. 1.31.15; 1.140.10; 6.75.1; 8.47.8; 10.107.7)varma = armour (RV 1.114.5; 6.75.8; 7.31.6); varmi = armed soldier (RV 6.27.6; 75.1; 9.108.6)

vr.s.apa_n.i = strong-armed (RV 6.75.7)

dha_ra_ = sharpened edge of a metallic weapon; ayaso na dha_ra_m (RV. 6.3.5; 6.47.10) dha_ra_ = blade (RV 2.34.1)

svadhiti = saw or cutting tool(RV 3.8.6); dirk (RV 1.162.18)
svadhiti: ks.n.otren.eva svadhitim sam. s'is'i_tam (RV. 2.39.7): sharpen the swords/axes on the whetstone. means a sword? Ks.n.otra = whetting stone, file or a lathe (RV 2.39.7) That it is a lathe is a reasonable surmise since wood dust comes out in the process and cleanses itself: niryot pu_teva svadhitih s’ucirga_t svaya_ kr.pa_ tanva_ rocama_nah: RV 7.3.9).
svadhiti = axe to cut wood and forests (3.2.10; and 11; 5.7.8; 8.102.19; 10.89.7; RV. 3.8.11) In RV 9.96.6, svadhiti is stated to be most effective among the tools that cut, svadhitir van_na_m. This indicates that the svadhiti is a saw. In AV 6.141.2, svadhiti is used to mark the two ears of an animal using a lohita (metallic, red) svadhiti; here, the meaning seems to be that of a knife.

asi = sword (RV 1.162.20; 10.79.6)
kr.pa_n.a = dagger (RV 10.22.10)
su_na = knife (RV. 1.162.13)
kr.ntatra = knife (RV 10.27.23; 86.20)

kha_di = arm-shield (RV. 1.166.9); hastes.u kha_di (RV. 1.168.3); kha_di hastam (wristlet or bangle or armlet: 5.58.2); patsu kha_dayo (anklet: 5.54.11; am.ses.u (Skandahe) kha_dayo (shoulder decoration: 7.56.13)
paras'u = axe (RV. 1.127.3; 3.53.22; 6.3.4; 7.104.21; 10.28.8)(s'is'ite paras'um sva_yasam = sharpened metallic axe (RV. 10.53.9); pra_ca_ gavyantah pr.thupars'avo yayuh da_sa_ ca vr.tra_ hatama_rya_ni ca = with big axes came to the east the cow-plunderes -- the Da_sas as well as some A_ryas (RV. 7.83.1) In Pa_n.ini it means a curved knife or axe or sickle (5.3.117)
Axes with long narrow blades are common. (Mackay, 1938, p. 455). “Most of the blades can be termed substantial for their size...blades of this group and type II would loose very little in weight of metal after a great deal of use. Blunt and turned up edges could easily be hammered into shape again.” (Mackay, 1938, p. 456).
vadhara = weapon (RV. 1.32.9; 4.22.9; 8.24.27) vadhatra, vadhans = deadly weapon, dart (RV 1.165.6; RV 5.41.13; RV 1.56.3; RV 7.6.5)
va_d.ho carpenter (S.) [vardh cut; wa_t. axe (Wg.)]
ba_ji = adze (Kon.) va_s'i_: va_s'i_ a_yasi_ (RV. 8.29.3): bronze tool-chisel, axe or adze. va_s'i_ = metallic tool-chisel, axe or adze (RV. 1.37.2; 1.88.3;); in the neolithic age, this was made of stone: as'manmayi_ va_s'i_ (RV. 10.101.10) taks.ya = chisel (RV 8.102.8)

kulis'a = axe, kut.ha_ra (RV. 1.32.5; 3.2.1) kulis’I = fine axe (RV 1.104.4)

R.gveda: references to metalsmithy

taks.a, tvas.t.r., r.bhu

In the R.gveda, the lexeme taks.am is used to define composition or fashioning. apu_rvya_ purustamanyasmai mahe vi_ra_ya tavase tura_ya; virips'ane vajrin.e s'antama_ni vaca_msya_sa_ sthavira_ya taks.am (RV. VI.32.1): a seer has composed unprecedented, comprehensive and gratifying praises for the mighty

Indra. agnaye brahma r.bhavastataks.uh (RV. X.80.7):the fashioning of hymns for agni is done by the r.bhus. Avestan tradition, Ahur Mazda_ is conceived as a carpenter who fashions the earth from wood and who fashions bodies and souls: ga_us'-tas'a_: da_idi mo_i ya_ gam ta'so_ apas ca urvaras ca: 'grant me thou -- who has created Mother Earth and the waters and the plants' (Yasna 51.7); hyat na_ mazda_, paourvi_m ga_eoasca tas'o_ dae_nasca_: 'since for us, O Mazda, from the beginning Thou didst create Bodies and also Souls' (Yasna 31.11)(*The Divine Songs of Zarathushtra*, pp. 682-3, pp. 210-1). gaus = ga_v (Skt. gau). The phrase mahigauh in RV refers to the earth. Tas'a is from the root tas' (Skt. taks.) = to create, to fashion; to hew, to cut. The cognate lexemes are: technos (Greco-Roman), tas'yati (Lith.)
The gavam-ayanam is a sattra related to the turning of the earth which is related to the solstice or the apparent shift of sun's motion. Maha_vrata day is the last day but one of the year; it was, as Tilak observed, a link between the dying and the coming year. (Tilak, *Arctic Home in the Vedas,* p. 122).

gavam-ayanam is a sattra similar to a_ditya_na_m-ayanam and an:gi_rasa_m-ayanam. Aitareya Bra_hman.a (iv,17) notes: "They hold the gava_m-ayanam, that is, the sacrificial session called the 'cows' walk'. The cows are the a_dityas (Gods of the months). By holding the session called 'the cows' walk', they also hold the a_ditya_na_m-ayanam (the walk of the a_dityas)." The origin of the sattra is described as follows (Dr. Haug's trans. Vol. II, p. 207): "The cows being desirous of obtaining hoofs and horns held (once) a sacrificial session. In the tenth month (of their sacrifice) they obtained hoofs and horns. They said, we have obtained fulfillment of that wish, for which we underwent the initiation into the sacrificial rites. Let us rise (the sacrifice being finished). Those that rose are those who have horns. Of those who, however, sat (continued the session), saying 'Let us finish the year', the horns went off on account of their distrust. It is they who are hornless (tu_para_h). They (continuing their sacrificial session) produced vigour (u_rjam). Thence after (having been sacrificing for twelve months and) having secured all the seasons, they rose (again) at the end, for they had produced vigour (to reproduce

horns, hoofs when decaying. Thus the cows made themselves beloved by all (the whole world), and are beautified (decorated) by all."

The sememe taks. refers to the technical skill of fashioning metallic objects. r.bhus do great deeds and have dexterous hands (svapasah suhasta_h) and frame a chariot for the as'wins (RV.1.111.1; X.39.4), fashion the vigorous horses for Indra (RV. 1.20.2; 1.111.1; III.60.2) and divide the single camasa into four (RV. I.161.2). The r.bhus fabricate the ratha (chariot)(RV. 1.111.1; IV.33.8), fashion agni for manu's sacrifice: dya_tva_ yamagnim pr.thive_ janis.t.a_ma_pastvas.t.a_ mr.gavo yam sahobhih, i_d.enyam prathamam ma_taris'va_ deva_stataks.urmanave yajatram (RV. X.46.) ye as'vina_ ye pirata_ ya u_ti_ dhenum tataks.urr.bhavo ye as'va_; ye amsatra_ ya r.dhagrodasi_ ye vibhvo narah svapatya_ni cakruh (RV. IV.34.9): r.bhus fashioned the chariots for as'vins, renovated their parents, restored the cow, fabricated the horses, made armor (am.satra) for the gods, separated earth and heaven and accomplished the acts of good results. Sa_yan.a explains the equivalence of tvaks. and taks. in re: RV. I.100.15: taks.u_ tvaks.u_ tanu_karan.e (to accomplish by reducing, scraping, cutting) in the context of the skills of carpentry, using tools. Taks.a is a professional like the bhis.ak (physician) and priest (Brahman): taks.a_ ris.t.am rutam bhis.agabrahma_ sunvantamicchati_ndra_yendo pari srava (RV. IX.112.1) The major wood-work included cutting of the sacrificial stake (yu_pa), fastening of the wooden ring (cas.a_la) on its top and fashioning of the wooden vessels: yu_pa vraska_ uta ye yu_pava_ha_s'cas.a_lam ye as'vayu_pa_ya taks.ati; ye ca_rvate pacanam sambharantyuto tes.a_mabhigu_rtirna invatu (RV. I.62.6) Tvas.t.r. carved the vajra, the weapon wielded by Indra to severe the limbs of vr.ttra (RV. 1.32.2; 52.7; 61.6; 121.3; X.48.3; 99.1); it is a_yasam (metallic)(RV. X.48.3) atha tvas.t.a_ te maha ugra vajram sahasrabhr.s.t.im vavr.tacchata_s'rim nika_mamaraman.asam yena navantamahi sam pin.agr.ji_s.in (RV. VI.17.10): fierce Indra, Tvas.t.r. constructed for thee, the mighty one, the thousand-edged, the hundred-angled thunderbolt, wherewith thou hast crushed the ambitious audacious loud-shouting ahi = vr.ttra. RV. I.85.9: tvas.t.a_ yadvajram sukr.tam hiran.yayam sahasrabhr.s.t.am svapa_ avartayat: refers to the shaping of the thunderbolt, vajra, by skilful (svapa_ =

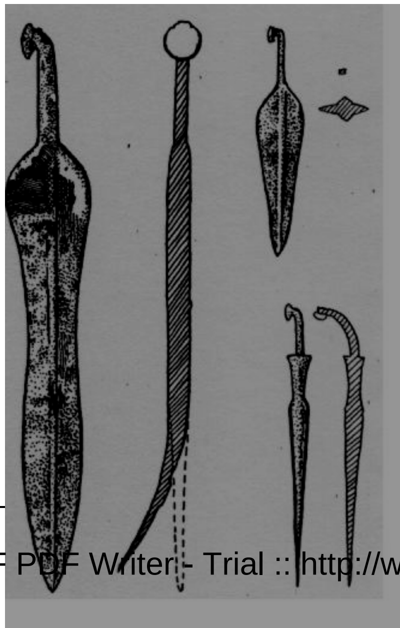
s'obhanakarma_); Sa_yan.a explains sukr.tam as samyak nis.pa_ditam or well made; hiran.yayam as suvarnamayam or golden; sahasrabhr.s.t.im as aneka_bhir dha_ra_bhir yuktam or 'of numerous edges'. Tvas.t.r. augments the strength of Indra by fashioning a vajra of overpowering vigour: tvas.t.a_ citte yujyam va_vr.dhe s'avastataks.a vajramabhibh_tyojasam (RV. I.52.7)

The transition from the lithic age to the bronze age is apparent from the description of adze or va_s'i as either metallic or made of stone and used for shaping wooden vessels: va_s'i_bhih as'manmayi_bhih (RV. X.101.10) R.gveda refers to smelter of metals (dhma_ta_: RV. V.9.5) and the smith (karma_ra: RV.X.72.2)[Schrader notes that the names of smiths in IE languages are often derived from the old Indo-Germanic names for stone of which the smiths' tools were originally made; e.g. hamarr (OHG); akmo_n (= anvil)(Gk.); as'man (=hammer, anvil, oven)(Skt.)

Tvas.t.r. is shown sharpening his metallic axe while fabricating the camasa bowl used for soma (apparently, the axe is used to fashion the bowl): s'isi_te nu_nam paras'um sva_yasam (RV. X.53.9) The camasa created by Tvas.t.r. is later divided into four parts by his disciples, the r.bhus: uta tyam camasam navam tvas.t.urdevasya nis.kr.tam (RV. I.20.6); akarta caturah punah (RV. IV.33.5-6)[Commenting on RV. I.20.6, Sa_yan.a says that r.bhus are the disciples of Tvas.t.r.: tvas.t.uh s'is.ya_r.bhavah. Elsewhere, Sa_yan.a refers to Tvas.t.r. as the preceptor of the r.bhus: r.havah tvas.t.a_ yus.madguruh (RV. IV. 33.5)]

The reference to ratha is: ratham suvr.tam (RV. 1.111.1). Sa_yan.a interprets this as well-built or good-wheeled: s'obhanavartanam sucakram va_ The carpenters' tools are: svadhiti which is used to cut and trim the wooden post: ya_nvo naro devayanto nimimyurvanaspate sva_dhitirva_ tataks.a (RV. III.8.6) va_s'i_ and paras'u are also creations of divine artificers: tvas.t.r. and r.bhus (RV. I.110.5; X.53.9-10) Vis.n.u prepares the womb and Tvas.t.r. adorns the forms: vis.nuryonim kalpayatu tvas.t.a_ ru_pa_n.i pim.s'atu (RV. X.184.1) svadhiti is used to create a well-made form (tvas.t.reva ru_pam sukr.tam svadhityaina_:AV. XII.3.33) Atharva Veda refers to the use of va_s'i_ by taks.an: yat tva_ s'ikvah para_vadi_t taks.a_ hastena va_sya_

(AV.X.6.3) RV I.32.5 alludes that Indra strikes Vr.ttra with vajra, as the kulis'a (=axe) fells a tree-trunk: ahanvr.tramk vr.trataram vyamsamindro vajren.a mahata_ vadhena; Skandaha_msi_va kulis'ena_ vivr.kn.a_ hih s'yata upapr.kpr.thivya_h. A cognate Indian lexeme is: kulha_d.i_ (a metallic blade with a cutting edge and a handle). r.bhu, vibhu, va_ja constitute a trinity; the r.bhus are saudhanvana_h (sons of Sudhanvan). The r.bhus are mortals who attained immortality by dint of their workmanship: marta_sah santo amr.tatvama_nas'uh (RV. I.110.4) Commenting on RV. I. 20.1, Sa_yan.a observes that r.bhus were pious men who through penance obtained deification: manus.yah santastapasa_ devatvam pra_ptah. Aitareya Bra_hman.a describes them as men who by austerity (tapas) obtained a right to partake of soma among gods (AB. III.30.2) ya_bhih s'aci_bhis'camasa_m apis'ata yaya_ dhiya_ ga_marin.i_ta carman.ah; yena hari_ manasa_ nirataks.ata tena devatvamr.bhavah sama_nas'a (RV. III.60.2): With those faculties by which you have fashioned the drinking bowl; with what intelligence wherewith you have covered the (dead) cow with skin, -- with what will by which you have fabricated two horses (of Indra); with those (means) r.bhus, you have attained divinity. Macdonell derives the term r.bhu from the root rabh, to grasp and explains it as handy or dexterous and identifies it with German elbe and English elf. (opcit., p. 133)



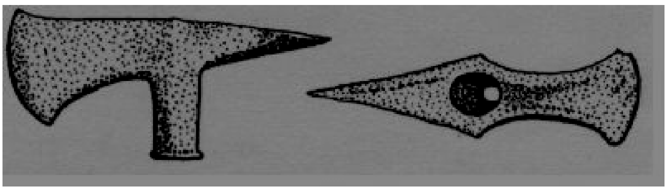
tvas.t.r., soma

Tvas.t.r. is the master of all forms and shaper of all animals (tvas.t.a_ ru_pa_n.i hi prabhuh pas'u_nvis'va_ntsama_naje)(RV I.188.9) He is the fashioner of the quick-moving horse: tvas.t.urva_ja_yata a_s'uras'vah (TS. V.I.11.3; KS. XLVI.2) The lexeme also means a fashioner or artificer (A.A.Macdonell, Vedic Mythology, p.117) Indra drinks soma in the house of Tvas.t.r. : tvas.t.ugr.hi apibat somamindrah (RV.

IV.18.3) Tvas.t.r. is referred to as supa_n.im, beautiful-handed; sugabhastim beautiful armed and r.bhvam shining or glorious (RV. VI.49.9) sukr.tsupa_n.ih svavau r.ta_va_ devastva.s.t.a_vase ta_ni no dha_t (RV. III.54.12): May the divine Tvas.t.r., the able artificer, the dexterous handed, the possessor of wealth, the observer of truth,bestow upon us those things (which are necessary) for our preservation. ugrastura_va_lamibhu_tyoja_yatha_vas'am tanvamcakra evah; tvas.t.a_ramindro janus.a_bhibhu_ya_manus.ya_ somamapibaccamu_s.u (RV. III.48.4): fierce, rapid in assault, of overpowering strength, he made his form obedient to his will; having overcome Tvas.t.r by his innate (vigour), and carried off the soma, he drank it (or deposited) in the ladles. These and other references lead Macdonell to surmise that Indra's father whom he slays in order to obtain the soma, is Tvas.t.r. (opcit., p. 57) [cf. Chaturvedi, P.S., 1969, *Technology in Vedic Literature*, Delhi, Books and Books].

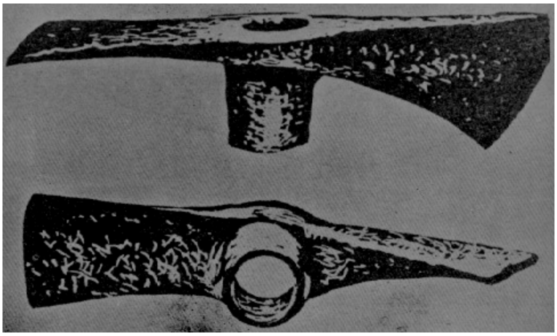
Axes, adzes

Mohenjodaro: shaft-hole axe-adze. Two pottery models of shaft-hole axes from Mohenjodaro are identical to the clay models of as early as the Al'Ubaid period in Mesopotamia. (Wheeler,R.E. Mortimer , 1953, *Indus Civilization*, 2nd edn., Cambridge, p. 55).

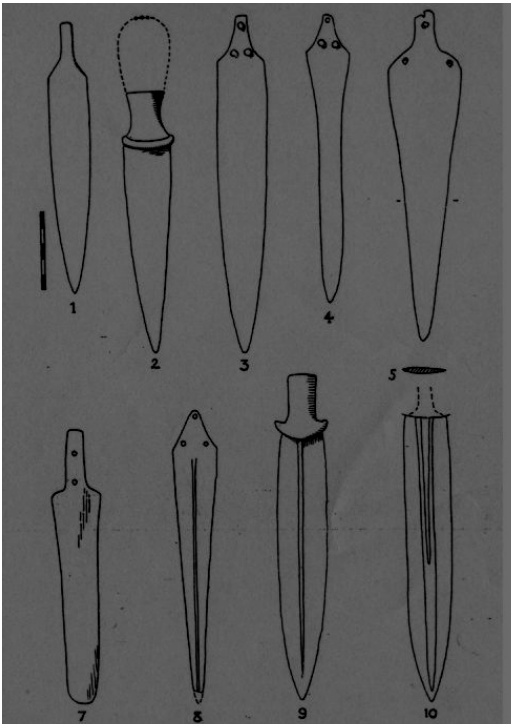


A type of axe-adze was also found in Mohenjodaro. "This very fine axe-adze is the first specimen of its kind to be found at Mohenjodaro, and it is also the first socketed implement to be found there." (Mackay, 1938, p. 457).

Tepe Hissar; from the 'Burnt Building' in level IIIB, ca. 2000 B.C. after Schmidt; combination of the basic forms of an axe and adze produced the axe-adze. Similar instrument was found in the reign of Shalmaneser III, ca. 850 B.C. Typical trough-



sprouted vessels found at Tepe Hissar are similar to the types used in the karum at Kultepe in Cappadocia. Use of lead vessels is also paralleled in Kultepe, ca. 1900 B.C. [Kultepe is the place in Anatolia, with tin mines, see Yener's notes.]



Tepe Hissar, ca. 2000 B.C.: spears with medial ribs and ridge-stopped tangs (Mallowan, Ill. 133) Tepe Hissar yielded gold, variegated jewellery, copper and silver vessels, many varieties of beads, among them much lapis lazuli; perhaps, Hissar was an entrepot in trade with taking the stone from the mines of Badakhshan.

Types 1.5, 7.10 Daggers and swords; Type 1. Tepe Sialk. Ghirshman, Fouilles, I, pl. LXXXV, S.127; Type 2. Ur. Woolley. Royal Tombs, pl. 228, U. 9121; Type 3. Ur. Woolley, op cit, pl. 228, U. 9117; Type r. Ur. Woolley, op cit, pl. 228, U. 8108; Type t. Soli, nr. Mersin. Luschan, Globus, LXXXII (1902), 297,3; Type 7. Not illustrated; Type 7. Chagar Bazar. Mallowan, Iraq, IV, 2 (1937), Fig. 13,4; Type 8. Ur. Woolley, Royal Tombs, pl. 228, U. 8140; Type 9. Ur. Woolley, op cit, pl. 228, U. 14222; Type 10. Ur. Woolley, op cit, pl. 228, U. 12479.

Type 1. This is the most primitive form of western Asiatic dagger, but until the blade was strengthened by thickening or a midrib down the centre and rivets wer eintroduced, it cannot have been a very efficient weapon, and must often have

buckled upon impact...The dagger from Tepe Hissar, however, shows traces of the V-shaped overlap of hilt and blade. It is interesting that this type, which first appears in those levels of Tepe Hissar and Tepe Sialk when smiths were beginning to cast in an open mould, was not confined to the Prehistoric period, and than an example from Nuzu is dated as late as the Third Dynasty of Ur or First Dynasty of Babylon. In western Asia the geographical distribution extends to Persia, Turkestan, the Assyrian Eastern Provinces, Babylonia , Asia Minor, the Caucasus, and Cyprus and it seems probable that on the Asiatic mainland the type originated in the highlands of Persia and spread to the river valleys in the Jemdet Nasr period or earlier when the inhabitants of this area became acquainted with the technique of metalworking and were able to obtain supplies of copper from the Zagros mountains or Cilicia...In the early third millennium the remarkable similarity of metal types all over western Asia suggests that smiths in different areas were in close contact with each other and that there must have been a centre situated in a metalliferous area where the smiths could learn their trade, and then once the technique was mastered could return home and invent local types. Cilicia, with its long tradition of trade in metal and metal objects, has been suggested by Smith (Early History of Assyria, 57 ff.) , while Frankfort (Archaeology and the Sumerian Problem) has stressed the importance of the Caucasus as a metallurgical centre in the Early Dynastic period. Against this view Jessen (A.A. Jessen and B.E. Degen-Kolvalevski, Iz Istorii Drevney Metallurgii Kavkaza, Moscow, Leningrad, 1935. English summary in Georgica, 1937, nos. 4 and 5, pp. 312 ff.) in his study of the ancient metallurgy of the Caucasus (in view of the fact that there is as yet no evidence that Caucasian copper ores were being worked as early as the first half of the third millennium, although this is probable), believes that it cannot be strictly established that the earliest metal objects found in the Caucasus were produced locally, and that it is not until later, in the second millennium, that the district attained its full importance as a centre for metalworking. The fact, however, that simple tanged rivetless daggers are found in the Kuban-Terek region at Novosvobodnaya (Carskya), Konstantinovka, and Privolnoe is not surprising in view of the widespread distribution of this type alll over the Near East, and Childe, in his summary of recently published Russian evidence, concludes that the

foundation of a local school of metallurgy in northern Caucasia begins in Period II (Schmidt's Middle Kuban period, ca. 2300-1600 BC0, when 'hammer-pins and other ornaments decorated in cire perdue in imitation of filigree work, narrow flat celts and flat rivetless daggers' are found. The extent of Mesopotamian influence on the Caucasus region in Period I is difficult to determint, but the available evidence suggests that it undoubtedly existed in or soon after the Early Dynastic period. A final solution mus tawait the results of further excavation, especially in the Kuban region.

"Type 2. Flat blade, pointed; slightly convex sides; tang with one, two or three rivets. This type represents an improvement on Type 1. Whiel the blade remains leaf-shaped and only slightly curved in section, the rivets in the tang ensured that the hilt and blade remained securely fastened together when the weapon was used in combat...On the Asiatic mainland most of the examples date from the Early Dynastic period, and there are many examples from Cyprus dating from as early as E.C.I (ca. 2700 BC), but the type remained in use until the middle of the second millennium. On the present evidence it seems to hae died out in Babylonia after the Sargonid period. Yet this form of dagger, which must have been evolved by an Asiatic craftsman in Early Dynastic times, is found later in Syria, Phoenicia and even Asia Minor as well as in Persia and the Assyrian Eastern Provinces...The popularity of this type of Asiatic dagger in Egypt during the Hyskos period, coupled with its occurrence in a Hyskos context at Ras Shamra, shows that the metalsmiths working in Egypt were not averse to copying a common Asiatic form which remained in use alongside the more elaborate types which belong to the Hyksos period in Egypt...

"Type 3. Flat balde; slightly convex sides; three rivets; shoulders sloping to narrow tang. In this type the arrangement of the rivets shows an attempt to ensure that the blade did not break off from the tang on impact. The tang is therefore shorter than in Type 2, and the blunt point on some of the extant examples may be due to lack of sharpening or, alternatively, may show that the blade was used as a tool where only a sharp cutting-edge was needed...Like Type 2, it is probably Sumerian in

origin, and subsequently spread into Palestine, Syria, Phoenicia and Cyprus. As yet no examples are known from Persia or Asia Minor...

Type 8. Pointed blade with curved shoulders; straight sides; triangular-shaped tang with three rivets; raised midrib down centre of blade. This is a technically advanced type, as is shown by the strong midrib, the arrangement of the rivets, and the straight sides. Typologically it is a logical development from Type 3. There would be no danger of the blade buckling on impact, and the leaf-shaped blade forms which may have sometimes proved a disadvantage (owing to the difficulty of withdrawing the weapon quickly) were discarded in favour of this narrow straight-sided form...As yet there are few extant examples of this type of dagger in western Asia outside Sumer...the fact that the Sumerian examples are probably earlier than the Cretan need not lead one to suppose that the idea originated only in Sumer...

"Type 9 and 10. Leaf-shaped blade; single or multiple ribbing down centre; bronze guard, separate from the blade which is socketed to take the wooden handle. Standard Royal Cemetery type, including most of the gold examples.

"The leaf-shaped blade was also strengthened by a midrib or longitudinal blood-rills and on present evidence Type 9 seems to have been more popular in western Asia than the straight-sided Type 8. The earliest examples of Type 9 are from Babylonia, and the type probably spread into Iran at the end of the third millennium, where it later developed into a short sword.""(Maxwell-Hyslop, Rachel, Daggers and Swords in Western Asia, in: ***Iraq***, Vol. VIII, 1946, pp. 1-65).

Spears with medial ribs have parallels from Carchemish and Ugarit in north Syria dated a century before 2000 B.C. Such spears do not appear to occur in Mohenjodaro or other Harappan sites.

Smiths (Sum. simug, Akk. nappa_hum), responsible for (s)melting and casting, were distinguished from metalworkers (Sum. tibira, Akk. gurgurrum) who worked metal and created objects. These, on the other hand, were distinctly different from

jewellers (Sum. zadim) and goldsmiths (Sum. ku-dim/dim, Akk. kutimmum)... Given the large number of metal tools, weapons and vessels recovered from sites in southern Mesopotamia, there is, as with ceramics, a frustrating lack of excavated workshop facilities.(D.T.Potts, Mesopotamian Civilization: The Material Foundations, 1997, Ithaca, Cornell University Press).

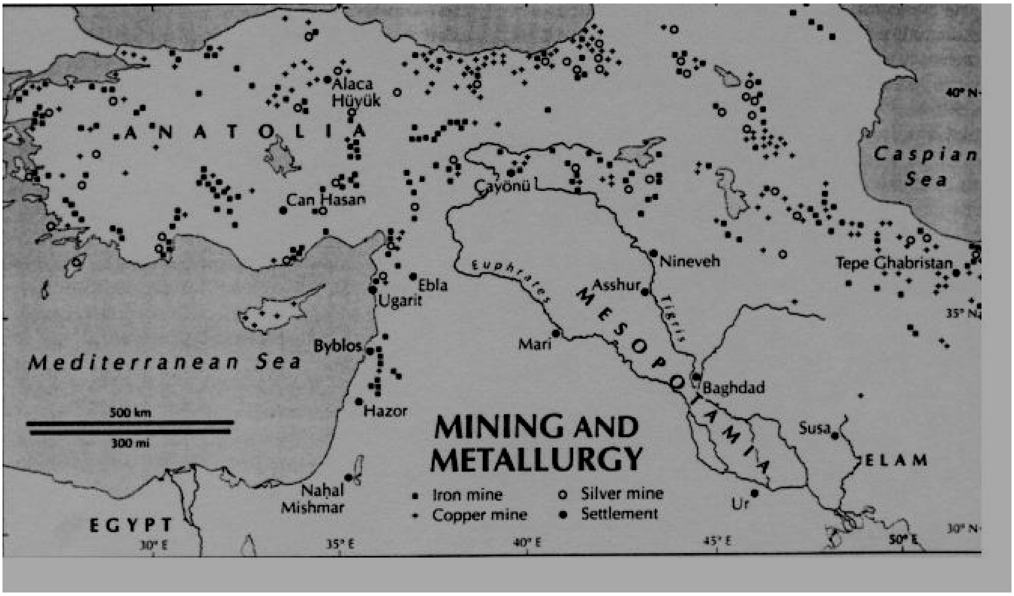
Swords, knives, daggers

> kr.ti = sword (RV. 1.168.3: has.tes.u kha_dis'ca kr.tis'ca = a guard and a sword; that which cuts. Sword (or scissor?). In Pa_n.ini, kr.ta (7.2.57) means 'to cut into pieces'.
>
> ks.ura = razor (RV. 1.166.10; 8.4.16; 10.28.9); yada_ te va_to anuva_ti s'ocirvapteva s'mas'ru vapasi prabhu_ma = with wind at its back, fire wipes out the trees and forests and 'shaves' the land just as the barber shaves (with a razor)(RV. 10.142.4)

Mackay (1938, p. 442, 466) notes: “The very substantial sword (Pl. CXIX,9) is surprising at so early a date; it shows that at all events some of the people of Mohenjodaro were well-armed...It is almost impossible to draw a line between knives and daggers; many of them may in fact have served both purposes...no sheath has yet been found. Whether of wood or leather or some woven material, none could have survived the dampness and saltiness of the soil. We do not even know how these weapons were carried.”

Based on the presence of arsenic, nickel and lead in artefacts from Mohenjodaro and Harappa, Ullah (1940) determined the sources of their copper to have been Khetri, Alwar, Singhbhum and Afghanistan mines where nickel and arsenic both are supposed to be present in the copper ores. He held that the Sumerian ores could be distinguished from Indian ores since the former are virtually free from arsenic (Ullah 1940)... Agrawal's Table 11 (1971) shows that at Khafaje and Ur, 88 percent of the artefacts contain arsenic.

...literary sources... sources of silver, including Dilmun, Aratta, Elam, Marhashi and Meluhha, all of which are to theast or south of Mesopotamia, Sargon of Akkad



referred to a locale in Anatolia as the 'Silver Mountain'...
Map depicting iron, silver and copper mines and ancient settlements of Mesopotamia and Anatolia. The clustering of copper mines west of Afghanistan and of iron mines in western Anatolia is analogous to the clustering of copper mines in Rajasthan area and of iron mines in the Ganga-Yamuna doab (Bihar).

Settlements of metal-workers

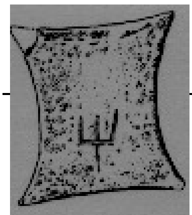
As in Egypt, so in Mesopotamia, the smiths who worked in the precious metals of gold and silver also worked in copper and bronze. [Copper pitchers and basins for hand washing at meals were placed in the tombs. An unusual example in the Metropolitan Museum of Art is plated with antimony to imitate silver, which was

very rare in the Old Kingdom (c. 2686-c. 2160 BC). The basins and the bodies of the ewers were hammered from single sheets of copper. The spouts of the ewers were cast in molds and attached to the bodies by means of copper rivets or were simply inserted in place and crimped to the bodies by cold hammering. [Source: 1994-1998 *Encyclopaedia Britannica*.]

Before the discovery of iron, i.e. in the bronze age, the settlements tend to cluster on river banks with easy access to the mines of copper and silver.

Tin distribution centres of Bha_rat

Tin. Sources. Tin used in Harappan civilization is well attested. (Hegde 1978; Chakrabarti 1979; Muhly 1985: 283; Stech and Pigott 1986: 43-4). Gudea c. 2100 BC, identified Meluhha as the source of his tin (Falkenstein 1966: i.48: Cylinder B: XIV). "...**tin may well often have travelled by sea up the Gulf from distribution centres in the Indus Valley**. In the Old Babylonian period tin was shipped through Dilmun (Leemans 1960: 35)... It is now known that Afghanistan has two zones of tin mineralization. One embraces much of eastern Afghanistan from south of Kandahar to Badakshan in the north-east corner of the country (Shareq et al. 1977); the other lies to the west and extends from Seistan north towards Herat (Cleuziou and Berthoud 1982), the valley of the Sarkar river, where the hills are granitic. Here tin appears commonly as cassiterite, frequently associated with copper, gold, and lead, and in quantities sufficient to attract attention in antiquity. Bronzes at Mundigak, and the controversial Snake Cave artefacts, indicate local use of bronze by at least the third millennium BC (Shaffer 1978: 89, 115, 144). A number of scholars have pointed out the possibility that tin arrived with gold and lapis lazuli in Sumer through the same trade network, linking Afghanistan with the head of the Gulf, both by land and sea (Stech and Pigott 1986: 41-4)." (Moorey, 1994, opcit, p. 298-299).



Inscribed Cretan copper ox-hide ingot (After Fig.82 in: Sinclair Hood, 1971, *The Minoans: Crete in the Bronze Age*, Thames and

Hudson) In the Late Bronze Age, oxhide and plano-convex shaped ingots were used in the Aegean; elsewhere, only small plano-convex (bun-shaped) ingots were used."Bronze tools and weapons were cast in double moulds. The cire perdue process was evidently employed for the sockets of the fine decorated spear-heads of the Late Minoan period. Copper was available in some parts of Crete, notably in the Asterousi mountains which border the Mesara plain on the south, but it may have been imported from Cyprus as well. The standard type of ingot found throughout the East Mediterranean in the Late Bronze Age was about two or three feet long, with inward-curving sides and projections for a man to grasp as he carried it on his shoulder. Smaller bun-shaped ingots were also in use." (Sinclair Hood, opcit., p. 106).

561-547 BC Silver stater attributed to Croesus, King of Lydia (ca. 560-547 BC) (After Kurt Regling, 1959, *Ancient Numismatics*, Chicago, Argonaut Inc.) Is this opposition between the lion and the one-horned bull a depiction of two weapons: **a_ra_** (saw-knife) and **val.** (sword) – assuming that the homonymous words connoted the lion and the heifer-bull?

The two tin ingots found at Haifa, Israel contain three signs and each of these signs have exactly concordant logographs in Harappan script as may be seen from the following list of three Harappan signs and sign variants:

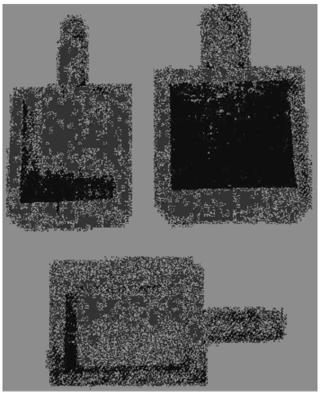
Ran:ga, tin ingots found at Haifa with inscriptions from Bha_rat!

Two late bronze age tin ingots from the harbor of Haifa, Israel contain Harappan logographs!

The picture of these two ingots was published by J.D. Muhly [New evidence for sources of and trade in bronze age tin, in: Alan D. Franklin, Jacqueline S. Olin, and Theodore A. Wertime, *The Search for Ancient Tin*, 1977, Seminar organized by Theodore A. Wertime and held at the Smithsonian Institution and the National Bureau of Standards, Washington, D.C., March 14-15, 1977]. Muhly notes:"A long-distance tin trade is not only feasible and possible, it was an absolute necessity. Sources of tin stone or cassiterite were few and far between, and a common source must have served many widely scattered matallurgical centers. This means that the tin would have been brought to a metallurgical center utilizing

a nearby source of copper. That is, copper is likely to be a local product; the tin was almost always an import...The circumstances surrounding the discovery of these ingots are still rather confused, and our dating is based entirely upon the presence of engraves signs which seem to be in the Cypro-Minoan script, used on Cyprus and at Ugarit over the period 1500-1100 BC. The ingots are made of a very pure tin, but what could they have to do with Cyprus? There is certainly no tin on Cyprus, so at best the ingots could have been transhipped from that island. How did they then find their way to Haifa? Are we dealing with a ship en route from Cyprus, perhaps to Egypt, which ran into trouble and sank off the coast of Haifa? If so, that certainly rules out Egypt as a source of tin. Ingots of tin are rare before Roman times and, in the eastern Mediterranean, unknown from any period. What the ingots do demonstrate is that metallic tin was in use during the Late Bronze Age...rather extensive use of metallic tin in the ancient eastern Mediterranean, which will probably come as a surprise to many people." (p.47)

Pran.i_ta. A wooden vessel in which the holy water is fetched. It is a square vessel with eight an:gula in length and breadth, four an:gula in height, with a bowl six an:gula in length and breadth and three an:gula in depth, capable to hold ½ prastha of water. It has a handle of ofour an:gula length. It is made of wood or bronze or clay, if the sacrificer desires brahmavarcasa and desires to practise black magic, etc. (TN Dharmadhikari, ed., 1989, *Yajna_yudha_ni, an album of sacrificial utensils with descriptive notes*, Pune, Vaidika Sams'odhana Man.d.ala).



The common sign in the two ingots found at Haifa is X with a ligature on top and also a short linear stroke at the bottom. Assuming that the other sign in the two ingots are synonyms, it would appear that the equivalences in pictographs are: antelope (on one ingot) and ladle (on another ingot).

The pran.i_ta has been depicted as a square ladle with a handle. It appears that the Signs 249 to 252 are variants with ligatures; sign 252 is a determinative that the pictograph connotes a liquid measure (with horizontal lines depicting the filling of the ladle with liquid).

Signs 249 to 252 and Variants of Sign 252

Sign 50 and Variants

Signs 184, 187 and Variants of Sign 184

In the linguistic area of the civilization, there are lexemes which match with three semantics: liquid measure, antelope and tin – an extraordinary coincidence indeed!

Depicting 'tin' through pictographs: antelope and ladle

ran:ka, ran:ga is **tin**, pewter (Santali.lex.)

ran:ka may be a synonym of **ran:ku** (**antelope**).

ran:ka in Tulu denotes a **ladle** capacity measure for liquids. ran:ga in Punja_bi is a tree whose leaves are eaten by goats (P.lex.) According to Sam.ska_ra Ratnama_la_, the pran.i_ta ladle is made of nyagrodha or **rauhitaka** wood.

[Tin ingots were traded through the Levant in the 2nd millennium BC; in the autumn of 1976 two ingots were found 'in the sea near the Phoenecian port of Dor, south of Haifa. Ingot 1 and Ingot 2; Museum of Ancient Art, Municipal Corporation of Haifa; local fishermen had raised about 7 tonnes of copper and tin ingots in Haifa. The date of the two ingots is uncertain. The symbols incised on the ingots also resemble Cypro-Minoan symbols used in Cyprus and Ugarit ca. 1500 to 1100 BC. May be, they were weighed at Ugarit and stamped as they travelled through the long overland caravan route right upto the western end. It is notable that Cyprus had no tin. Sources: Anon., Ingots from wrecked ship may help to solve ancient mystery, *Inst. Archaeo-Metallurgical Studies Newsletter*, No. 1, 1980, 1-2; Maddin, R., T.S. Wheeler and J. Muhly, Tin in the ancient Near East: old questions and new finds, *Expedition*, 1977, 19, 35-47].

Sources of tin: the great enigma of Early Bronze Age archaeology

The enigma will be resolved once the inscriptions of the Sarasvati Civilization are read, at least in relation to distribution sources of the Sarasvati Sindhu river valleys.

In texts from the 19th century BCE, it appears that trade was performed in a professional, capitalistic way (at least during a period of almost a century in the Old Assyrian period): barter by boat over the Euphrates and the Persian Golf and with regular caravans by donkeys to Anatolia (modern Turkey).

Merchandise. Apart from cereals the inhabitants of Mesopotamia themselves had little to offer. Cereals were indeed exported but was too bulky for donkey transport over long distances. Imported material from elsewhere were again exported. Like tin, an important metal for bronze, that in those times probably came out of Afghanistan(although there are many Tin-routes). It was exported to Anatolia, a major center of metal industry, where in extensive forests wood was abundantly available to fuel the furnaces. Other merchandise were dates, sesame oil and in

particular craft materials.Babylonia had an extensive wool industry. Coupons of 4 by 4.5 meter were in the 19th century BCE transported by the hundreds. From Anatolia silver and gold was imported(see Kültepe and process of commerce).

Financing the trade. The merchants usually form family concerns, with a son in the caravan business and an other as agent in Kanesh. Investments by other people also are significant. Partnerships are entered with moneylenders to finance the transactions. Investment is done in gold through so called zak-contracts (the Akkadian name). A partnership consists of 14 persons, who collect together 30 mine gold (a mine is about 500 gram). The merchant himself has a double share: the director is the largest stockholder. The value of 30 mine gold corresponds to the equivalent of 600 slaves or 1000 yearly wages of an average workman. If someone takes a share in a zak-contract he pays half of it in silver which is booked as the equivalent in gold. Silver is a medium of exchange. The contractual term is 12 years and one guarantees a profit of 100% (normal loans have an interests of 30%, so the profit is large). Dividend is paid during the term of the contract. Special rates apply at half-term withdrawal.

"The Early Bronze Age of the 3rd millennium B.C. saw the first development of a truly international age of metallurgy... The question is, of course, why all this took place in the 3rd millennium B.C... It seems to me that any attempt to explain why things suddenly took off about 3000 B.C. has to explain the most important development, the birth of the art of writing... As for the concept of a Bronze Age one of the most significant events in the 3rd millennium was the development of true tin-bronze alongside an arsenical alloy of copper... That such (arsenic alloy) ingots would be silver in color and were therefore known as annaku in Akkadian and d'm in Egyptian (E.R.Eaton and H. McKerrell, World Archaeology 8 (1976): 179f.) is extremely unlikely because the former means 'tin' and the latter 'electrum'... Many theories have been presented to account for the spread of metallurgy in the 3rd millennium B.C., through Beaker Folk in the west, torque-bearers in Europe and the Eastern Mediterranean, and Khirbet-Kerak people in the Near East, as well as Cycladic colonists in Iberia and Trojan prospectors in eastern

Europe. Such theories involve large-scale migration of peoples over vast distances, migrations often identified with one ethnic group such as Indo-Europeans or Hurrians. It is probably best to reject all such theories, along with the elaborate archaeological reconstructions that have accompanied them. There is no evidence to support the existence of any specialized group of metalworkers in the Early Bronze Age, and it has not been possible to substantiate any theory of migration or colonization at this time. Even the famous Indo-European migration into Greece and Anatolia is in need of a comploete reinvestigation... Now everyone, from the British Isles to India and China, emphasizes the local origins of technology developed by indigenous cultures. Surely the pendulum has swung in the opposite direction and we are seeing the extreme reaction to an equally extreme past position. The truth must lie somewhere in the middle ground... In fact the spread of tin-bronze, the other major development in copper metallurgy in this period, implies the existence of some type of long-distance trade. As there are no known sources of tin anywhere in the Aegean, the Eastern Mediterranean (apart from Egypt), or the Near East, the appearance of tin-bronze in such widely separated areas as north-western Anatolia (Troy), Cyprus (Vounous), and southern Mesopotamia (Ur and Kish) requires a network of trade routes covering a considerable area... The sources of tin being used in the 3rd millennium B.C. remain the great enigma of Early Bronze Age archaeology...

“The Old Assyrian letters from the Anatolian merchant colony (or ka_rum) at Kultepe, ancient Kanes', covering the period known as ka_rum II, 1950-1850 B.C. , provides extremely detailed information on shipment of loads of tin (Old Assyrian annukum) from the capital city of Assur to the members of the private business-houses residing at Kanes'... All that we know is that the tin was brought to Assur, presumably from points to the east, and from Assur shipped overland by annual donkey caravans to central Anatolia. We also know that the textiles, representing the other half of the trade goods sent to Anatolia, came from Babylonia to the south... With disturbances in the north, especially in the Zagros mountains, cutting off the trade in tin with Anatolia, Sams'i-Adad I (king of Assyria, ca. 1850-1600 B.C.) shifted his interests westward and Mari (located on the upper part of

Euphrates midway between Aleppo and Baghdad) became an entrepot on a trade route that brought tin up the Euphrates to Mari... the texts are vague as to the ultimate source of this tin, but it seems to be coming from Iran by a southern route through Susa. There is also some indication that Elamites were involved in the trade...

“The tin was shipped to Mari in the form of ingots (Akkadian le_'u) and there stored in various parts of the palace known as abu_sum (storeroom), the bi_t kunukki (seal-house), and the kisallu (courtyard)... More evidence on the copper trade comes from Old Babylonian Ur, where the excavator, Sir Leonard Woolley, uncovered the house of Ea-na_s.ir, a merchant who specialized in the trade in copper, located at what Woolley called No. 1 Old Street. A number of texts found in the area and dating to the reign of Rim-Sin, king of Larsa (1822-1763 B.C.), record Ea-na_s.ir's activities in the copper trade, which consisted of importing what is called Tilmun copper... called Magan copper in earlier periods, which was shipped to Mesopotamia up the Persian Gulf. [A. Leo Oppenheim, The Seafaring Merchants of UR, JAOS 74 (1954): 6-17, and J.D. Muhly, 1973, Copper and Tin, Conn.: Archon., Hamden; Transactions of Connecticut Academy of Arts and Sciences, vol. 43) p. 221f.]... However, the shipment of tin all the way from Iran to southern Mesopotamia and up the Euphrates to Ugarit and beyond to Crete represents a trade route of epic scope... the so-cakked Dark Age lasting from ca. 1600 to 1400 B.C... saw the establishment of the Hurrian kingdom of Mitanni, with its Indo-Aryan background (T. Burrow, The Proto-Indo-Aryans, 1973, *Journal of the Royal Asiatic Society*, 1973: 123-40)... the recipes for making bronze contained in many Bronze Age cuneiform texts. The following text from Mari is a good example: (Text is G. Dossin: Archives de Sumu-lamam, roi de Mari, RA 64 (1970): 17-44, esp. 25, text n.6. The specification te-ma-yu which appears in several texts from this archive, is really of unknown meaing). Here the proportions are quite exact: 20 shekels of tin is added to 170 shekels of copper (almost 1:8) to make exactly 190 shekels of bronze. This means that there was a fair amount of metallic tin in use during the Late Bronze Age. By ca. 1400 B.C. tin was being used in Greece to cover clay vases destined for the grave, in order to make them

look like silver, and to line ivory cosmetic boxes to keep the ivory from being stained by the rouge or ointment placed inside..."

1.1/3 MA.NA AN.NA
2. a-na 2 5/6 MA URUDU.LUH.HA
3.TE-MA-YU
4. i-na 8 GIN.TA.AM ba-l[i-e]l
5. SU.NIGIN 3 MA.NA 10 GIN ZABAR
6. a-na nam-za-qi-im

1/3 mina of tin to 2 5/6 minas

of washed copper from
Tema (?) has been alloyed

at the ratio of 8:1
Total: 3 minas, 10 shekels

Notes:

takaram = tin, white lead (Ta.Ma.); t.agromi = tin metal, **alloy** (Kuwi)

[cf. homonyms:

tagar, t.agaru, tagaru = a **ram** (Ka.); tagara, tan:gad.i_ (M.H.); tagarde_ru having a ram for his vehicle: fire; tagarven.agisu to cause rams to fight (Ka.lex.)

tagara = a shrub with fragrant white flowers, ***taberna montana coronaria*** ; tagare = nandivardhana (Te.)(Ka.lex.); it appears that both these homonyms have been depicted in pictographs in inscriptions].

nis.ka = allusion to a goldsmith (RV. 8.47.15); may also mean gold coins (RV. 1.126.2, 4.37.4, 5.27.2)

loha = red (RV.); lohitaka = of red colour, reddish (Pa_n.ini's As.t.a_dhya_yi: 5.4.30); lohita_yasa = red metal, copper, made of it (Pa_n.ini's As.t.a_dhya_yi: 5.4.94) Pa_n.ini's As.t.a_dhya_yi: 5.4.94 states that ayas denotes a genus or a name (hence, may connote metal): anas as'man ayas saras ityevamanta_t tatpurus.at, t.ac pratyayo bhavato ja_tau sam.jn~a_ya_m ca vis.aye = anas (cart), as'man (rock), ayas (metal), saras (river) denote a genus or name; lohita_yasam is a sam.jn~a_ or name; ka_la_yasam is a genus or aja_ti.
ayil = iron (Ta.); ayiram = any ore (Ma.); aduru = native metal (Ka.)

> cf. River Brahmaputra_ was called lohitya_ in the bra_hman.a texts.

ayorasa = metal rust (RV.); an:ga_ra = charcoal (RV.); ayastamba = metallic pitcher (RV. 5.30.15); a_yasi_ = metallic (RV. 1.116.15, 1.118.8, 7.3.7, 7.15.14, 7.95.1); ayas = metal (prob. copper or bronze)(RV. 1.57.3, 1.163.9, 4.2.17, 6.3.5, 6.47.10, 6.75.12, 10.53.9-10).
loha: metal that is extracted (Skt.) cf. Akkadian le_'u = ingots
loha_dhyaks.a = director of metal work (Arthas'a_stra : 2.12.23)
ka_rma_ra = metalsmith who makes arrows etc. of metal (RV. 9.112.2: jarati_bhih os.adhi_bhih parn.ebhih s'akuna_na_m ka_rma_ro as'mabhih dyubhih hiran.yavantam icchati_) karmaka_ra = labourer (Pa_n.ini's As.t.a_dhya_yi:ka_rukarma = artisan's work (Arthas'a_stra : 2.14.17); karma_nta = a workshop or factory (Arthas'a_stra : 2.12.18, 23 and 27, 2.17.17, 2.19.1, 2.23.10). kan- = copper work (Tamil)
d'm = electrum (Egyptian); assem= electrum (Egyptian); somnakay = gold (Gypsy); soma = electrum (RV)(See analysis in: Kalyanaraman, Indian Alchemy).
"According to ratios given in the texts tin was very cheap, as high as 240:1 and 180:1 in a tin/silver ratio. What is curious is that bronze was

twice as expensive as tin, for a text says of a payment that 'if (paid) in tin (it should be) at the ratio of four minas (of tin) per (shekel of silver), if in bronze at the rate of two minas.' (Text is Harvard Semitic Studies (HSS) XIV as quoted in Chicago Assyrian Dictionary (CAD), s.v. annaku, 129a). This seems to indicate a great increase in the amont of tin in circulation during the period 1500-1300 B.C... One text even refers to an alloy (Akkadian billatu) composed of 1 mina of copper and 8 1/2 shekels of tin, giving a ratio of 7:1. (Text is Keilschrifttexte aus Assur verschiedenen Inhalts 205, quoted in CAD, s.v. billatu, 226a.) In the Old Assyrian period one text gives a ratio of 8:1 (4 minas of copper, 1/2 mina of tin, the metal being destined for the smith, Akkadian nappa_hum)(Text is Cuneiform Texts from Cappadocian Tablets in the British Museum (CCT) I 37b, quoted in CAD, s.v. annaku, 128a.)

[Notes:
bi_d.u = alloy of iron (Tu.)
pis.t.aka = agglomerate of fine particles (Arthas'a_stra : 4.3.147)
pa_ka = roasting, cooking (Arthas'a_stra : 4.1.64, 5.2.24)
dravi = smelter or metalsmith who melts metal (RV. 6.3.4: tignam... paras'uh na jihva_m dravirna dra_vayati da_ru dhaks.at: fire devours wood with its axe-like sharp tongue, just as the smelter melts the metal).
s'ulva = copper; underground vein of metal ore or water (Arthas'a_stra : 2.13.16 and 44; 2.14.20-22 and 30-31; 2.12.1, 2.24.1); vellaka = an alloy of silver and iron in equal proportions (Arthas'a_stra : 2.14.22);
ta_mra = copper (Arthas'a_stra : 2.12.23-24, 2.13.52 and 58, 2.17.14, 4.1.35); na_ga = lead (Skt.);
trapu = tin (RV; Pa_n.ini's As.t.a_dhya_yi: 4.3.138)(Skt.); capala = quickmelting tin or bismuth ore (Skt.);
kan:sa = bronze (RV.);
kajjala = lamp-black used as collyrium (Pa_n.ini's As.t.a_dhya_yi:

6.2.91) an~jana = collyrium (RV.); = antimony compound/sulphide (Arthas'a_stra : 2.11.31, 2.12.6 and 24; 2.22.6)
ka_m.sya = related to bell-metal (Pa_n.ini's As.t.a_dhya_yi: 4.3.168);
a_raku_t.a = brass (Skt.); pittal.ai = brass (Ta.)]

(See J.D. Muhly, New evidence for sources of and trade in bronze age tin, in: *The Search for Ancient Tin* , Washington, D.C., Smithsonian Institution Press, 1978, pp. 43-48)(James D. Muhly, The Bronze Age Setting, in: Theodore A. Wertime and James D. Muhly (eds.), 1980, *The Coming of the Age of Iron*, New Haven, Yale University Press, pp.25-67.)

Copper. Sources. "Muhly (1973: 220 ff.; 1976: 104 ff.) has thoroughly reviewed the ancient textual sources for the use of copper and its trade in Mesopotamia, with extensive commentary on their relation to known deposits in the area. Archaic texts frok Uruk (III) indicate that already by the later fourth millennium BC Dilmun was engaged in the metals trade (Englund 1983). In the third millennium Sumerian texts list copper among the raw materials reaching Uruk from Aratta (Pettinato 1972: 82-3, 128) and all three of the regions Magan, Meluhha and Dilmun are associated with copper, but the latter only as an emporium (Limet 1960: 85ff.; Waetzoldt 1981). Gudea refers obliquely to receiving copper from Dilmun: 'He (Gudea) conferred with the divine Ninzaga (Enzak of Dilmun), who transported copper like grain deliveries to the temple builder Gudea...' (Cylinder A: XV. 11-18: Englund 1983: 88, n. 6). Magan was certainly a land producing the metal, since it is occasionally referred to as the 'mountain of copper'. It may also have been the source of finished bronze objects (Limet 1972: 14-17). In the early second millennium BC Mesopotamia may have lost direct contact with Magan, and with Meluhha, also earlier mentioned in relation to copper. Copper now came through Dilmun and its traders... Copper came by way of Dilmun until at least the eighteenth century BC, when there is a break in the records almost exactly at the same time as the earliest surviving textual indications of copper from Alashiya

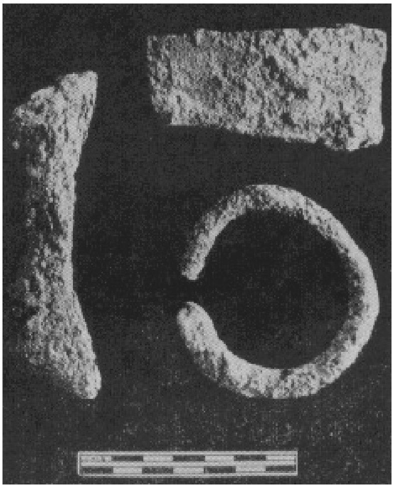
(Cyprus) reaching Mari and Babylonia (CAD, s.v. alas'u; Schaeffer 1971: 547 ff.; Millard 1973).

“The Mari texts also refer to a type of copper qualified by the term te-ma-yu, for which Dossin (1970: 39 n.1) suggested an association with Teima in Saudi Arabia, serving as an entrepot for copper from the Feinan/Wadi Arabah mines (cf. Hauptmann et al. 1989)... It has been argued that it was the eclipse of the Indus Valley civilization in the second quarter of the second millennium BC that brought to an end the flourishing Indus-mesopotamian trade up the Gulf; but this has yet to be satisfactorily confirmed. Stray indicators suggest continuing, if intermittent, activity. In the middle of the fourteenth century BC a Babylonian official was stationed on Dilmun, whence he reported back on local threats to the date crop. Then Tukulti-Ninurta I of Assyria (c. 1243-1207 BC), after his sack of Babylon, assumed the title 'King of Dilmun and Meluhha', emphasizing contemporary Babylonian interest in these regions, even if the full implications of the ancient names no longer applied (Brinkman 1972: 275-6; 1976: 314). Danish excavators revealed considerable evidence for the occupation of Bahreain and Failaka in the Kassite period (Bibby 1972: 358 ff.). Otherwise documents contain no explicit references in the later second millennium to the sources of copper (cf. Potts, D. 1990: i. 232 ff.)...

“Copper occurred extensively in Iran, Afghanistan (Berthoud et al. 1977) and the Indian Subcontinent (Muhly 1973: 234 ff.; Ratnagar 1981: 96-7)...Almost half of the objects so far analysed from Cemetery A (Early Dynastic IIIB) at Kish have arsenic in excess of 2 per cent, as do about 33 per cent of those from the Royal Cemetery at Ur; in the north an arsenical copper tradition is the most prevalent throughout the third millennium BC... About a third of the total, have tin from 0.012 to 15.9 per cent... at both Gawra and Ur, arsenical copper was the metal in greatest use... siparru means copper when referring to unworked metal; bronze when the object is finished work; eru_ means copper in all contexts; sometimes 'not iron'." (Moorey, 1994, opcit, p. 245)

"... circular bun-shaped ingots found on third- to second-millennium sites in Oman (Hauptmann et al. 1988: 41, fig. 4:6), which indicate that this was the shape in which at least some Omani copper was traded in the Near East at this time. It may, however, have been the standard for many other source zones. A group of five circular bun-shaped ingots of copper were included in the mid-third-millennium BC 'Vase a la Cachette' excavated at Susa. They have been associated with ingots of this shape found in the Gulf and in Indus Valley settlements (Tallon 1987: nos. 687-92, pls. 262-4). Two bun-shaped ingots were found in a contemporary context at Tell Chuera in Syria (Moortgat and Moortgat-Correns 1978: 66ff., fig. 29a-b).(Moorey, 1994, opcit, p. 244).

While the external trade with the Mesopotamian civilization might have been carried out through middlemen in Oman or Bahrain (George F. Dales and Louis Flam, 1969, On tracking the woolly kullis and the like, *Expedition* 12.1 : 15-23; Gregory L. Possehl, 1986, *Kulli: an exploration of an ancient civilization in South Asia*, Durham, NC, Carolina Academic Press), there have been instances of direct travel by sea of Harappan merchants to deal with the merchants of Mesopotamia. (Dilip K. Chakrabarti, 1990, *The External Trade of the Indus Civilization*, New Delhi, Muinshiram Manoharlal).



Carnelian stone is available in Madhya Pradesh and Rajasthan in India and also in Kathiawad at Rajpipla near the village of Ratanpur (Marshall, 1931: 681). Another source of carnelian are the dry branches of the Helmand River in Seistan, near Shahr-I-Soktha (Tosi, M., 1969, Excavations at Shahr-I-Soktha: preliminary report on the second campaign, September-December 1968, *East and West* 19 (3-4): 374). There is epigraphical evidence from a cylinder seal of Gudea of Lagash who states that bright carnelian, copper, tin, lapis lazuli come from the land of Meluhha. (Leemans,

W.F., 1960, *Foreign Trade in the Old Babylonian Period*, Leiden: E.J. Brill).

Kalibangan: pre-Harappan copper objects. (After B.B. Lal, 1979, Kalibangan and the Indus Civilization, in: D.P. Agrawal and Dilip K. Chakrabarti, eds., *Essays in Indian Protohistory*, Delhi, B.R. Publishing Corpn., Plate V). “Technologically, the pre-Harappans were in what may be described as the chalcolithic stage, i.e. using copper alongside stone for the preparation of tools. Thus, in the latter category were blades of chalcedony and agate. Some of these were backed and serrated and it is likely that they were hafted in a row on a wooden handle and used for cutting and sowing. Even harvesting must have been done with these. The use of copper for tools is duly attested to. Of it were found an axe and a paras’u, the latter having a very distinctive shape. It has no parallel in the Harappan ensemble, but examples of it have been found at two other places, viz., Mitathal, District Hissar, Haryana where it occurred in Period Iib (Suraj Bhan 1975, fig. 14,4,7) and Khurdi in District Nagaur, Rajasthan, the actual context in this case, however, being not known. (*ASI* 1961, pl. IIIb). Here it is also worth mentioning that this type of tool is still used in Rajasthan for cutting scrubby bushes. It is hafted at the end of a wooden rod.” (B.B.Lal, 1979, p. 70).

Running on method of joining. The parts to be joined are cleaned and molten bronze is poured over the parts to be joned. A tanged sword was joined to its hilt by this method.

Soldering method involved the use of an alloy which has a lower melting point. The soft solder is applied by a heated metal rod. Sanahullah notes that Harappans could perform gold and silver soldering.

Rivetting method involved the hammering down of simple metal rods at both ends to constitute a rivet. Rivet holes have been noticed in knives, bracelets and lances.

Lapping was the method used to join tubular handles to the vessel. Teal welding was also known to the Harappans.

Alloying. Tin, lead and arsenic were alloyed with copper. The criteron of determining whether the alloying is deliberate is accidental is the presence of more than one percent of tin. Out of 100 artefacts examined, 30 had tin content ranging from 8 to 12 percent. Arsenic alloying was used in 8 percent of the artefacts. Nickle alloying was used in 4 percent of the artefacts and lead alloying in six percent of the artefacts.

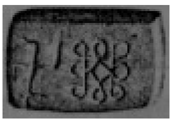
Higher percentage tin was used in alloys used for bangles and pins.

Spear 2.27%; engraver 3.96%; mirror 5.47%; chisel 9.62%; bangle 11.82%; pin 13.83%.
The Harappans were metal forgers, smiths and craftspersons capable of producing weapons, tools, instruments, pots, toys, jewellery and decorative pieces of metal.

Finds of svastika on seals and finds of weapons



Mohenjodaro: One side has the svastika motif turning counterclockwise; the reverse shows a short-horned bull with head lowered to the feeding trough; four script signs on top; the seal is perforated from the side along the axis of the animal motif. (Unfired gray brown steatite; 2.04cm. square; Mohenjodaro HR 4503; Mohenjodaro Museum 50.258, MM487; Marshall, 1931, pl. CX.311; After Kenoyer, J.M., 1998, cat. No. 18).



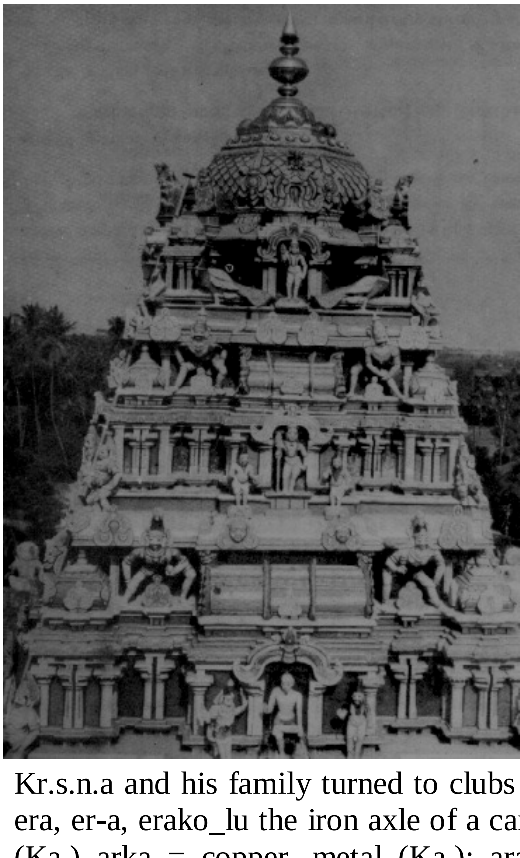
Mohenjodaro; tablet in bas relief; motif: svastika_ and endless knot; (Mackay, 1937, LXXXII-3).

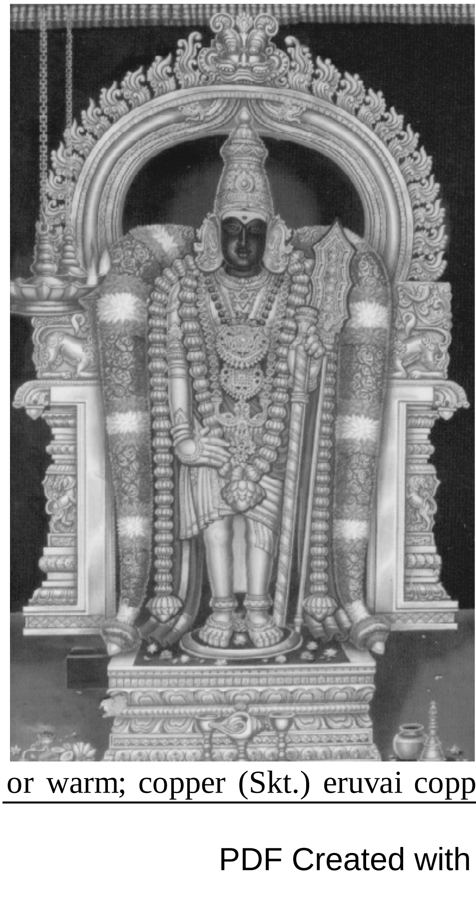
"A copper blade (Marshall 1931: pl. 136, f.3) found in one of the upper levels, though termed a spear-blade, may conceivably have been a knife (Plate IX, no.1). An exactly similar blade, but with a slightly longer tang, was found in the A mound at Kish (Mackay 1929a: pl. 39, gp. 3, f.4)... attention should be called to a steatite seal from Kish, now in Baghdad Museum, which bears the svastika symbol. This seal, both in shape and design upon it, exactly resembles the little square seals of steatite and glazed paste that are so frequently found at Mohenjodaro (Marshall 1931: pl. 144, f. 507-15). I do not think that I err in regarding the Kish example, which was found by Watelin, as either of Indian workmanship or made locally for an Indian resident in Sumer... The curious perforated vessels shown (Marshall 1931: pl. 84, f. 3-18) are very closely allied to perforated vessels found at Kish (Mackay 1929a: pl. 54, f. 36), especially in the fact that besides the numerous holes in the sides there is also a large hole in the base, which suggests that by this means they were supported on a rod or something similar... I have suggested, from evidence obtained by Sir Aurel Stein in southern Baluchistan, that these perforated vessels were used as heaters...(E.J.H.Mackay, Further links between ancient Sind, Sumer and elsewhere, Antiquity, Vol. 5, 1931, pp. 459-473).

A_yudhaji_vi , Yaudheya, Ka_rttikeya

The archaeology of Ka_rttikeya of the historical periods, is central to an understanding of the metal-workers' arts and crafts of the civilization which date back to ca. 3500 BC.

Ka_rttikeya is the warrior par excellence. The inscriptions of the civilization were made by armourers and listed metallic weapons and armour, either owned as property items or destined for trade with neighbouring civilizations such as Mesopotamia. There is a shrine of Subrahman.ya (another name for Ka_rttikeya) in Tamil Nadu. The deity is called E_raka Subrahman.ya. eruvai denoted copper (Old Tamil). eru_ = copper (?), bronze [eru_ = engrave, carve] e_rake, erake = a sort of grass, which when plucked by

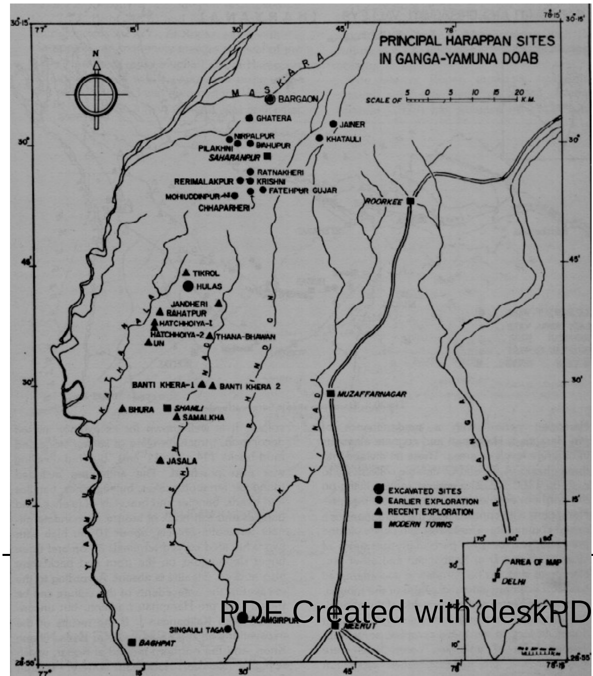




Kr.s.n.a and his family turned to clubs (Ka.) era, er-a, erako_lu the iron axle of a carriage (Ka.) arka = copper, metal (Ka.); araka = sulimation, a sublimate (Ka.); arka (M.); araku, oraku = a gilt or silver wash (Ka.M.) arkin = shining, bright (Vedic); ark = to heat or warm; copper (Skt.) eruvai copper, blood (Ta.); ere a dark red or dark brown

colour (Ka.)(DEDR 817). er-e, er-upu red colour (Te.); eruvai = copper, blood (Ta.); irumpu iron (Ta.); inumu (Te.)arak = red, scarlet (Santali) arus'a = red (Vedic) eraka, er_aka = any metal infusion (Ka.) erkem (pl. erke) = billhook (Go.)(DEDR 824). erukku to cut, hew, strike (as a budh)(Ta.); erk- to cut down bushes, etc., in clearing land (Pa.); to cut down (grass, bushes)(Go.); erga (ergi_) to make a clearing, clear jungle or thick grass or scrub; act of clearing a jungle (Kui); erg- (-it-) to cut, slash (Kuwi); engde to clear away weeds, cut down a jungle (Malt.)(DEDR 824). A homonym may indicate the choice for a pictographic representation of 'eraka', copper or billhook: e_rakam = a goat (Ta.) eral.e, erale = an antelope, a deer; black and spotted antelopes (Ka.); iralai (Ta.); le_d.i (Te.)

The vima_na of E_raka Subrahman.ya swami sanctum in Swa_mimalai, on the banks of the Cauvery river and a river named Aracala_r-u; a painted rendering of Ka_rttikeya deity of the temple, carrying the s'akti weapon (Note the typical wavy style of the spearhead which echoes some of the metal objects found among the copper hoards on the Sarasvati River Basin. The term 'e_raka' added as an attribute of the deity is also related to copper metallurgy., since eraka , era_ka means 'a metallic infusion'. There is an equisite sculpture of Sarasvati_ in a sitting pose in the pra_kara of the sanctum, reinforcing the close association of the birthplace of Ka_rttikeya, i.e. S'aryan.a_vat (later, Harya_n.a) also mentioned in the R.gveda and the location of the place on the banks of the Sarasvati River. It is no coincidence that the peacock motif is associated with both Sarasvati_ and Ka_rttikeya who was nurtured by seven mothers. In the Maha_pura_n.am in Tamil, the



ks.etra maha_tmya is said to have been related to the r.s.is of the Naimis.a_ran.ya. A unique feature of the temple is that the aira_vatam is located in front of the deity in memory of the legend that Indra gifted the aira_vata elephant in recognition of the contribution made by Ka_rttikeya as commander in chief of the devas. This temple and the sthalapura_n.am associated with the pilgrimage center, which is among the six celebrated pilgrimage places for Skanda-Ka_rttikeya in Tamil Nadu, are a remarkable evocation of the memories of the lives of ancestors of Bha_rat, on the Sarasvati_ River.

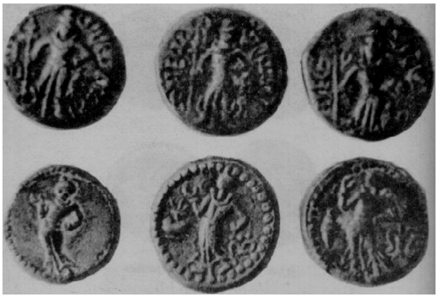
Archaeological sites in the Ganga-Yamuna Doab

Principal Harappan Sites in the Ganga Yamuna Doab: Bargaon, Hulas and Alamgirpur (After K.N. Dikshit, 1984, Fig. 30.3).

Taijasa is a sacred place on the banks of the Sarasvati_ river. This place has a shrine of Varun.a. It was here that Ka_rttikeya (Skanda) was coronated as the commander of the armed forces of the devas. (MBh. Vana 83/164).

Soundara Rajan, while noting that leadership of the civic or rural communities of the Chalcolithic Cultures of the post-Indus Valley (and during the colonization of the Ganga Valley) were not crystallized into a particular coterie or tribe. He adds an insightful footnote: “The A_yudhaji_vis mentioned in the va_rtika of As.t.a_dhya_yi of Pa_n.ini (and applicable later to the Malava and the Yaudheya gan.as) involved groups not claiming any administrative apparatus but mainly of peripatetic mercenary status.” (K.V. Soundara Rajan, Motivations for Early Indian Urbanization: An examination, in: Gregory L. Possehl, 1982, *Harappan Civilization*, pp. 68-75). This reference to A_yudhaji_vis is significant in the context of the evolution of the bronze-age and metal crafts in the Harappan civilization.

Yaudheya. Coins bearing the pictorial of Ka_rttikeya (Brahman.yadeva) and the inscription: yaudheyagan.asya jaya(h) (After Swami Omanand in: Parmanand Gupta, *Geography from Ancient Indian Coins and Seals,* New Delhi, Concept Publishing Company, plate 2).



A clay sealing of the Yaudheyas found at Sunet, near Ludhiana, bore the legend Yaudheya_na_m jayamantradhara_n.a_m (of the Yaudheyas, the possessors of the secret charm of winning victories), The Yaudheya coins refer to the Yaudheyagan.a, but a seal in the collection of Gurukul Jajjhar (Rohtak District), refers to the Yaudheya janapada. Its four-lined legend has been read as: r(ai)pati yaudheya jana(pa) da prakr.ta_na_ka nagara (Interpretation: a seal of a fort named Raipati of the Yaudheya janapada which was like heaven (na_ka) as a result of the exertion of the people. What has been taken as yu_pa in railing may also be read as the letter vi_ and thus the first line may be read also as Vi_rapati.

A legend on another sealing reads as bhattinika_ya (interpreted as Skt. Bhat.t.inika_ya, i.e., a group of soldiers, a reference to their army. The As.t.a_dhya_yi (4.1.178 and 5.3.117) refers to the Yaudheya tribe and the va_rttika on 5.3.117 includes them in the list of 'tribes living on arms'. The Yaudheyas worshipped Ka_rttikeya, the commander-in-chief of the devas, whose name and figure occur on some of their coins. The finds of Yaudheya coins are dated to between ca. first century BC and early 4^{th} cent. AD. (After Bhagavandeva Acharya, 1965, *Vi_rabhu_mi Haraya_n.a_* (Hindi), Gurukula, Jhajjar, Dist. Rohtak; loc. cit. Thalplyal, K.K., opcit, p. 21).



Udayagiri Hill, cave 3 (Vidis'a Dist., Madhya Pradesh); Ka_rttikeya ca. 408 AD; exquisitely ornamented with armlets and necklaces. (Photo: American Academy of Benares; after Harle, J.C., 1973, Late Kusan, early Gupta: a reverse approach, in: Norman Hammond, ed., South Asian Archaeology, Duckworth, London, Pl. 17.5)



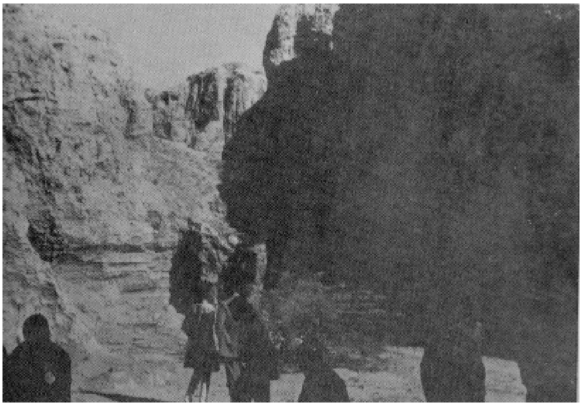
Kus.a_n.a, 2nd cent. AD; red sandstone; s'aktidhara Skanda. Headdress: turban with knotted crest. Carrying the s'akti weapon. Delhi, National Museum. The story of the birth of Skanda in a reed forest was perhaps known to Pa_n.ini. (As.t.a_dhya_yi 6.3.16).

Pratiha_ra 9th cent. AD. S'a_sta_ Skanda. Tribhan:ga pose. S'ikhand.aka headdress, wearing ornamented arm-bands on all four arms and beaded bracelets on the writws. The right hand feeds the peacock with citron fruit, a second right hand holds a manuscript (Brahma-s'a_sta_); a left hand holds the s'akti weapon. S'akti devi to his left.

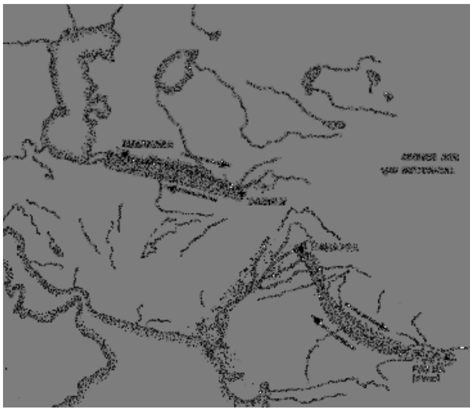


"The discovery of a fair number of coin mounds of the Yaudheyas at Sunet in Ludhiana District (*Journal of the Numismatic Society of India*, IV, p. 48; *Proceedings of Asiatic Society of Bengal*, 1884, LIII, pp. 138-39), at Khokra Kot in Rohtak District (Birbal Sahni, Technique of Casting Coins in Ancient India, pp. 1-32), and Naurangabad in Bhiwani District shows that these three places were mini-towns and presumably important centers of the Yaudheyas in

early Christian era...The findspots of the coins, coin-moulds, coupled with the evidence of the inscriptions seem to indicate that the Yaudheya's territory comprised an area that may be roughly defined as being bounded on the west by a line from Bahawalpur along the Sutlej and the Beas upto Kangra, on the north-east by a straight line drawn from Kangra to Saharanpur via Panipat and Sonepat to Bharatpur, and on the south by a line drawn from Bahawalpur via Suratgarh, Bhatner and Sirsa to Bharatpura. (Majumdar, R.C., *Corporate Life in Ancient India, 2nd edn., p. 27*)



Sirsa. Mounds on the banks of the Sarasvati River. (After Bapat, V.D., and Umapathy, K.R. (tr.), 1994, *Lost' River Sarasvati, Mysore*, Bharatiya Itihasa Sankalana Samithi (tr. from Vakankar, L.S. and Parcure, C.N., 1992, *Lupta Sarasvati_ Nadi_ s'odh* (Marathi).



Bronze Age and historical patterns in Central Asia and India (After S.P. Gupta, 1982, Fig. 3.1).

According to Swami Omanand, the seals, coins and coin-mints of the Yaudheyas come from Alwar, Bharatpur and Dhaulpur (Rajasthan), Bahawalpur State (Pakistan), Hissar, Jind, Karnal, Ambala, Rohtak, Gurgaon, Mahendragarh (Haryana), Delhi, Dehradun, Saharanpur, Muzaffarnagar, Meerut, Bulandshahar, Aligarh, Mathura, Mainpuri, Etah, Badayun, Bareilly, Bijnore, Pilibhat, Shahjahanpur and Rampur in Ujttar Pradesh. The Krodapakha Durga near Multan in the north and Mandsaur in Madhya Pradesh

in the south are the last limits where the influences of the Yaudheyas have been traces...Cunningham identifies the Yaudheyas with the modern Johiyas who occupy both banks of the Sutlej along the Bahawalpur frontier called Johiya-bar after them and believes that Mount Judh of the Salt Range may have derived its name from them (Cunningham, A., 1963, *Coins of Ancient India*, pp. 75-76)...Altekar, S.N.Majumdar Sastri and others have given the Yaudheyas the credit of building up the large republic extending from Ludhiana to Saharanpur in one direction and from Saharanpur to Bahawalpur in another. (Cunningham, A., 1924, *Ancient Geography of India*, Calcutta)...The coins bear the effigy of god Brahman.yadeva and figure of the peacock also along with the legend (Bhyavatasva_mino Brahman.yadeva Kuma_rasya, in the name of the war-god Brahman.yadeva (i.e. Ka_rttikeya)...The earliest reference to the yaudheyas is met within the As.t.a_dhya_yi_ of Pa_n.ini (V.3.117). They are mentioned as an a_yudhaji_vi sam.gha, i.e. a people living by profession of arms, in the gan.apa_t.ha. In the Maha_bha_rata (Dron.aparva 18.16; 132.25; 136.5; Karn.aparva 4.46), the Yaudheyas have been grouped with other peoples such as 'sibi, trigarta." (Parmanand Gupta, *Geography from Ancient Indian Coins and Seals*, New Delhi, Concept Publishing Company, pp. 61-70).

In an incisive analysis, S.P. Gupta, compares two cultures: (1) Late Harappan and Early Iron Age of India and (2) Late Bronze Age/Early Iron Age of Soviet Central Asia and notes a common cultural process conforming to a definite pattern of diffusion and the creation of pockets of settlements developed between the prehistoric and historical cycles of urbanization in these two regions:

A hypothesis can be proposed based on these two observations of Soundara Rajan and S.P. Gupta: that the A_yudhaji_vis and the metalsmiths of the Harappan Civilization had, in their eastward migrations, to overcome the problems created by the desiccation of the Sarasvati_ River, interacted with created pockets of settlements in the Ganga-Yamuna valley and gradually expanded their knowledge of the use of bronze metal to achieve a transition to the Iron Age in India in collaboration with the chalocolithic cultures.

Hulas in the Ganga-Yamuna doab; terracotta inscribed sealing. Also found were fragmentary burnt bricks The site with Harappan habitation was about 3 hectares. (After K.N.Dikshit, 1984, Pl. 105).

Meluha, copper

In Pali, meluha means, 'copper' Hence, the 'land of Meluhha', mentioned in Mesopotamian texts, may refer to the region where copper was available. One such region was Khetri, in Rajasthan.

In many ancient texts of Mesopotamia, dilmun may refer to the modern Bahrain, Magan may refer to modern Makran and Oman and Meluhha may refer to the Sarasvati and Sindhu Valley regions. Meluhha is the region from which came goods such as: hard woods, tin or lead, copper, gold, silver, carnelian, shell, pearls and ivory. Also mentioned as coming from Meluhha are animal (figures) of red dog, cat, peacock or black partridge and monkey. Imports from Mesopotamia included: wool, incense and gold. The bird mentioned is: *dar-me-luh-ha* or *dar-me-luh-ha-musen*; the bird itself or ivory models of birds: "Three mana of ivory, cut, out of which 1 small male figure, 3 small female figures, 1 dar-musen-me-luh-ha, a bird" (UET III; Legrain 1947: 228, no.757). A Sumerian bird *dar-me-luh-ha-musen* has an Akkadian equivalent *su-la-mu* which seems to indicate that the bird is black. According to Benno Landsberger (1962: 148), this may refer to the Persian Black Partridge (*francolinus francolinus henrici*). Chicago Assyrian dictionary calls this *ittidu*; in Indian languages, *tittira* refers to the black partridge which is found in Sindh, across Iranian Plateau, into the Near East and Turkey (Ali, Salimj and Ripley, S.Dillon, 1983, *Handbook of the Birds of India and Pakistan*: *Compact edition*. Delhi. OUP: 99-100).

"The land of Melukkha shall bring carnelian, desirable and precious, sissoo-wood from Magan, excellent mangroves, on big-ships!" said a statement in the Sumerian myth, **Enki and Ninkhursag** (cf. lines 1-9, trans. B. Alster). "In the late Early

Dynastic period (about 2500), Ur-Nanshe, king of the Sumerian city-state Lagash, "had ships of Dilmun transport timber from foreign lands" to his capital (modern Tell al-Hiba), just as a later governor of Lagash, named Gudea, did in the mid-twenty-first century. In the early twenty-fourth century, Lugalbanda and Urukagina, two kings of Lagash, imported copper from Dilmun and paid for it with wool, silver, fat, and various milk and cereal products... That these (round stamp) seals were used in economic transactions is proven by the discovery of two important tablets bearing their impressions. One of these tablets was found at Susa, and dates to the first half of the second millennium. It is a receipt for goods, including ten minas of copper (about eleven pounds or five kilograms). The second tablet, in the Yale Babylonian Collection, is dated to the tenth year of Gungunum of Larsa (modern Tell Senkereh), that is, around 1925, and records a consignment of goods (wool, wheat, and sesame) prior to a trading voyage that almost certainly had Dilmun as its goal. Dilmun seals characteristically depict two men drinking what could be beer through straws, or two or three prancing gazelles...a merchant named Ea-nasir, who is identified as one of the a_lik Tilmun, or "Dilmun traders"...

“Ea-nasir paid for Dilmun copper with the textiles and silver that he received from the great Nanna-Ningal temple complex at Ur...The Mari texts contain several references to Dilmunite caravans...Melukkha was a source of wood (including a black wood thought to have been ebony), gold, ivory, and carnelian...Melukkha was accessible by sea...Sargon of Akkad...boasts that ships from Dilmun, Magan and Melukkha docked at the quay of his capital Akkad...While points of contact with other regions are attested, they can hardly have accounted for the strength and individuality of civilization in the subcontinent...Unmistakably Harappan cubical weights of banded chert (based on a unit of 13.63 grams) are known from a number of sites located around the perimeter of the Arabian GUlf, including Susa, Qalat al-Bahrain, Shimal (Ras al-Khaimah), and Tell Abraq (Umm al-Qaiwain)...an inscribed Harappan shard has been found at Ras al Junayz... Harappan pottery has been found at several sites throughout Oman and the United Arab Emirates...A "Melukkhan village" in the territory of the ancient city-state of Lagash, attested in the thirty-fourth year of the reign of Shulgi (2060), may have been a settlement of

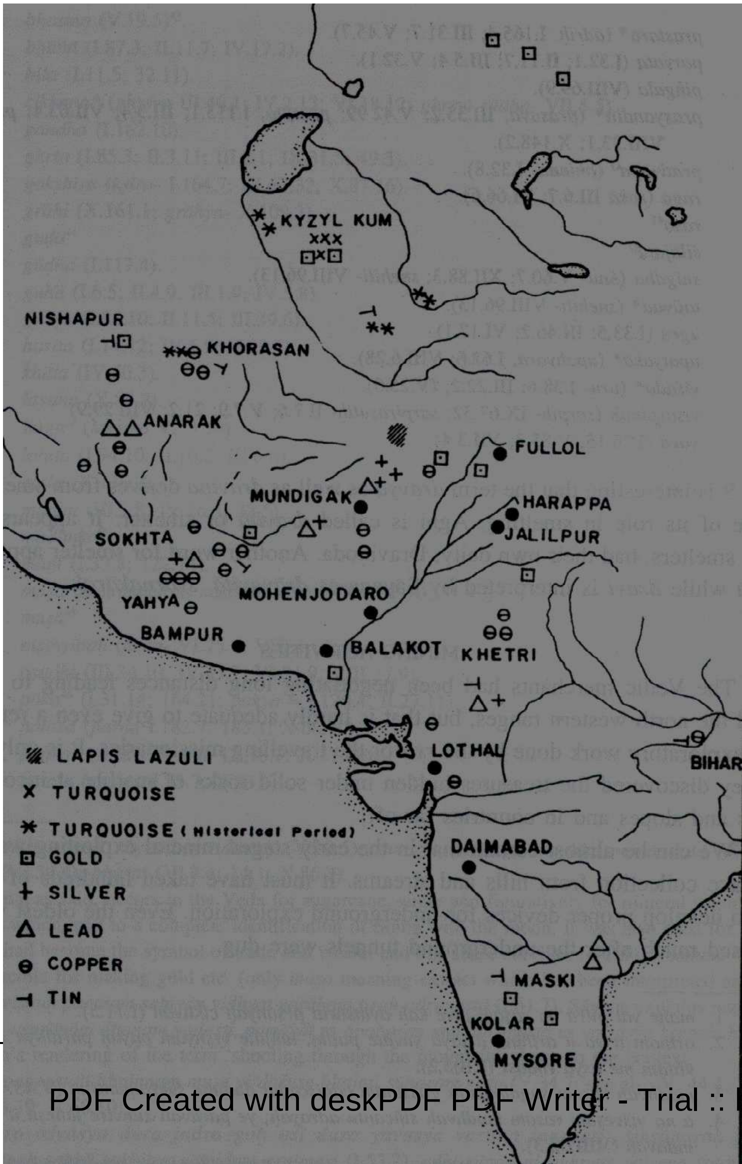
Harappans, if the identification with the civilization of the Indus Valley is correct...But...there is little evidence of a Sumerian, Akkadian, or Babylonian presence in the Indus Valley... That the language of Melukkha was unintelligble to an Akkadian or Sumerian speaker is clearly shown by the fact that, on his cylinder seal, the Akkadian functionary Shu-ilishu is identified as a "Melukkhan translator"...the word "Melukkha" appears occasionally as a personal name in cuneiform texts of the Old Akkadian and Ur III periods. " (Potts, D., 1995, Distant Shores: Ancient Near Eastern Trade, in: Jack M. Sasson (ed.), ***Civilizations of the Ancient Near East***, Vol. I, pp. 1451-1463).

" In antiquity bulk transport was only really possible by water, and for a region particularly concerned with the import of metals, stones and timber this is always important. It was also considerably cheaper and faster...

“The vessels suitable for Mesopotamia waterways were small craft, made of local materials, which varied little in form through their long recorded history and may be assumed to go back ultimately to the earliest settlements on river banks... Very little is known of the boats involved in the Gulf trade. It is not even known whether these boats were able to beat to windward as the later lateen rig allows them to do... It is, however, usually assumed that at sea rowing was only a secondary means of propulsion (cf. Ratnagar 1981: 160 ff.; Graeve 1981: 176 ff.) and that sails were widely used. Seals from Failaka confirm this and illustrate vessels rigged with a single square sail (Kjaerum 1983: nos. 162-6)... First, from at least the fourth millennium BC, there was the donkey or ass. Then, from some time in the third millennium BC, the domestication of the horse in the region brought the mule, an ass-horse hybrid. The camel does not appear to have been used as a pack-animal before the first millennium BC, outside eastern Iran (Compagnoni and Tosi 1978)...The mule goes at 3 to 4 mph, covering about 20 to 25 miles a day loaded..."(Moorey, 1994, opcit, p. 10).

"The canals were constantly used as highways. Beginning in the historical period, the sail seems to have existed as an auxiliary; in most cases boats were driven by oars or were towed...Every large city had a regulatory agency (called the 'Wharf', after the name of the place where it conducted its operations) for maritime transactions; from this we can deduce the degree of organization of river commerce. The commercial ships, often rented, that travelled up and down the canals did not have a large capacity; in the time of Dynasty III of Ur, mention is made of loads from 900 to 2,500 liters of grain. A bas-relief in the

Louvre depicts a convoy of cedar logs from Lebanon lying off the coast of



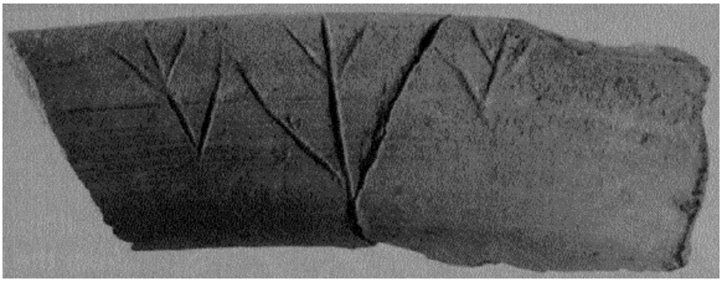
Phoenicia." (Maurice Daumas, opcit, pp. 131-132).

Mineral sources and minerals trade of the civilization. (After Shashi Asthana, ‘Harappan trade in metals and minerals: a regional approach’, in: Gregor L. Possehl, ed., 1982, *Harappan Civilization*, Delhi, Oxford and IBH, Fig. 25.1)

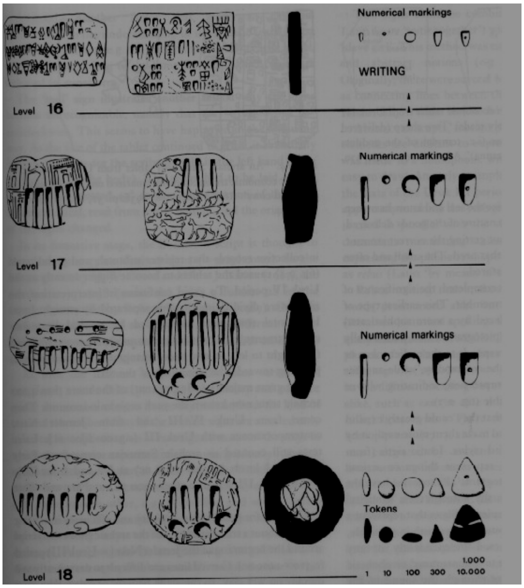
Map showing major sites and possible regions for trading in metal weapons and tools from the Sarasvati River Basin (After Kenoyer, J.M., 1991, Urban Process in the Indus Tradition: A preliminary model from Harappa, in: Meadow, Richard H., ed., 1991, *Harappa Excavations 1986-1990: A multidisciplinary approach to third millennium urbanism*. Madison: Prehistory Press, Monographs in World Archaeology, 3.

Section 6: River Sarasvati: Archaeology, Language, Writing System

In a situation where no substantive ‘Rosetta Stones’ with bilingual or multi-lingual inscriptions have been found, a rational understanding of the keys to decipher the inscriptions of the civilization which was nurtured on the banks of the River Sarasvati and River Sindhu is to be based on correlating the archaeological evidence and the lexical evidence of the linguistic area.



The challenge is not only to provide the keys to the writing system but also to define the framework of the parole or the languages of the linguistic area.



"As the archaeologist armed with pick and shovel, descends into the depths of the earth, in order to trace the footsteps of the past in bone and stone-remains, so the student of language-- washed on the shore of history from ages immeasurably remote-- to reconstruct the picture of the primeval age... (Evolving a new method called the 'Comparative Antiquities')... It is on this triple basis that the present work is founded, being designed as a comprehensive account of what we know at present about the pre-historic period of the Indo-European race." Schrader, O., *Pre-historic Antiquities of the Aryan Peoples,* 1890, Translation by Jevons, F.B.,from German Sprachvergleichung und Urgeschichte, 1890/

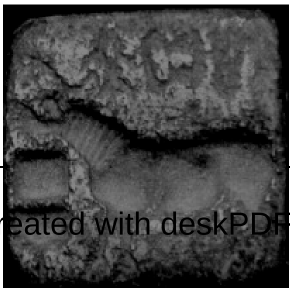
The evidence from archaeology has firmly established the continuity and substantially indigenous evolution of the civilization which had a writing system right from ca. 3500 BC. The HARP finding of Prof. Meadow (Feb. 1999, Harappa) indicates the possibility that the script of the civilization was perhaps the earliest writing system of the world.

Harappa. Potsherd with incised signs dated to ca. 3500 – 2800 BC. (Copyright: Harappa Archaeological Research Project, Harvard University, USA).

Susa: bullae and tablets with numerical markings in layers (Levels 16 to 18), ca. 3300-2900 BC. Level 18: (a) bullae with tokens and numerical markings; (b) tablets with numeral markings; Level 17: tablets with numerical markings; Level 16: tablets with numerical markings and proto-elamite script. (After Vallat, Francois, 1986, The most ancient scripts of Iran: the current Situation, *World Archaeology* 17(3): 337, fig.1)

The Harappan script has built up further on this idea of 'writing' contained in the Uruk bullae and clay tablets. The pictorial motif is evolved into masterpieces of art to depict specific animal motifs and ligatured motifs. Together with numbers, pictograms are also introduced to denote emphatic HOMONYMS to connote substantive descriptions of bronze age merchandise. That the new writing system of the Harappans uses an entirely new set of pictograms as signs is a clear indication that the underlying language is neither Sumerian nor Proto-Elamite. In any case, the Sumerian and Elamite had evolved a pictographic system to record the accounting transactions. There are, however, hints that the substrate language of Sumer did contain lexemes which gain currency in the Harappan Linguistic Area (which is elaborated elsewhere in the context of the construction of the ancient Indian Lexicon of 25+ languages).

The classification and samples of inscriptions presented herein, provide a clue as to the function served by many inscriptions. Inscriptions on bronze implements/weapons (11) and copper tablets (135) could perhaps have been done only by a metal-smith-fire-worker. There is a reasonable inference here: many messages may relate to the 'economic activity' of metal-smiths. This inference is consistent with the emergence of the Bronze Age in neighbouring civilizations which have also attested to contacts with the Sarasvati-Sindhu civilization sites (witness, for e.g. the finds of cylinder seals in Indian sites and the finds of 'Indus' seals and artefacts in Mesopotamian sites.)



Mohenjodaro: silver seal with inscription, unicorn and

standard device motifs , one of two found (Mackay, 1938 vol.2, Pl. XC, 1; XCVI, 520).

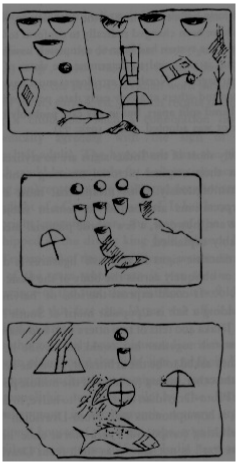
Another inference may be drawn from the fact that copper was a valuable commodity in those times. The use of a copper tablet to convey a message would strengthen an inference that great importance was attached to the message conveyed through the inscription on such a copper plate. It should be noted here that two silver seals have also been discovered.

The 'economic activity' of metal smiths includes (sic) the production of metal objects such as vessels, tools and weapons. The inscriptions may (!) therefore constitute a record of 'objects' possessed by the owner of the inscribed object whether the 'owner' is a metal-smith or a customer serviced by the metal-smith or armourer or rathaka_ra (chariot-maker). Many inscriptions may, thus, be bills of lading or property lists of armour and arms.

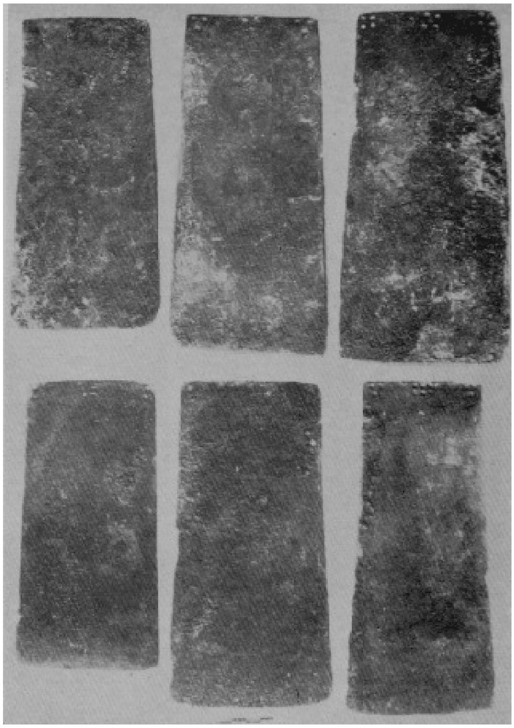
Some Akkadian inscriptions were used as bills of lading

"The addresses on fragments of clay at Tello prove that sealings were employed on bundles despatched from city to city." (L.W. King: *A history of Sumer and Akkad*, 1910, pp. 236-7)...

We have to be very cautious in interpreting the individual signs and individual pictorials; because, given the small size of the corpus, virtually ANY lexemic or phonemic or even artistic (cultural) value may be assigned and ANY language may be read into the inscriptions, if inscriptions they are in a language and do not merely represent artistic extravaganzas.



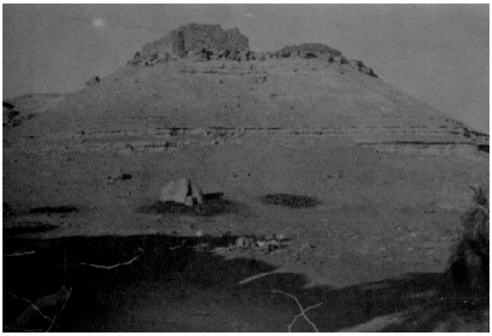
A solution to minimize, if not avoid, such a fallacy lies in adding synergic value to the individual inscriptions by clustering them in a concordance-like fashion. The next steps presented in the work are a construction of a series of concordances not based on mere sign lists but a combination of sign clusters, sign-variant clusters and pictorial clusters. Every effort will be made to avoid the dangers of 'spurious' correlations in dealing with a small population (in a statistical sense).



The decipherment problem is one of relating the clusters of pictorials/signs in inscriptions with the language of the civilization, considering the remarkable consistency and stability of the script for nearly a millennium spread across the most expansive civilization of its time, spanning considerable distances from the Sarasvati-Sindhu doab to the Tigris-Euphrates doab and with intimations of contacts with Ancient Iran and communities in South India.

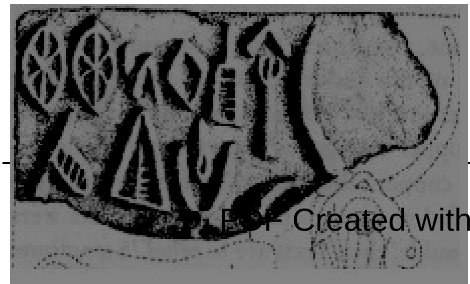
Uruk: archaic Sumerian tablets with numbers and fish signs (After thd drawing by J.V. Kinnier Wilson, 1987, rations and the Indus script: some new arguments in the case for accountancy, *South Asian Studies, 3*, 43, fig.2 based on photographs in Falkenstein, 1936, texts 256, 68 and 336)

Ganeshwar: copper celts with indentations (Lat. Celtis, chisel; metal with beveled cutting edge). The celts measure 20 to 25 cm. Long and weigh between 1 and 1.5



kg. Most of them have round indentation marks on one side of the top. The number of indentations vary from 2 to 16. The numbering system with such marks or dots seems to have some bearing on ancient accountancy. Agrawala notes that the indentation marks on the Ganeshwar celts are near the butt end while those on the chalcolithic celts from Kayatha and Navdatoli in Madhya Pradesh are on the body of the celt, much below the butt end, suggesting an earlier date for the Ganeshwar celts. The Ganeshwar celts do not show any alloying with tin, but there is a lead content of about one percent. A reasonable surmise is that the Kurada celts with four marks were prepared in the Ganeshwar region, along with copper bowls. Kurada was situated on a trade route which runs through Ganeshwar, Kurada, Pokaran, Phalodi, Jailsalmer, Kot Diji. Kurad.a means an 'axe'. (R.C. Agrawala, Aravalli, 1984, the Source of Copper, in: B.B. Lal and S.P. Gupta, *Frontiers of Indus Civilization*, p. 161).

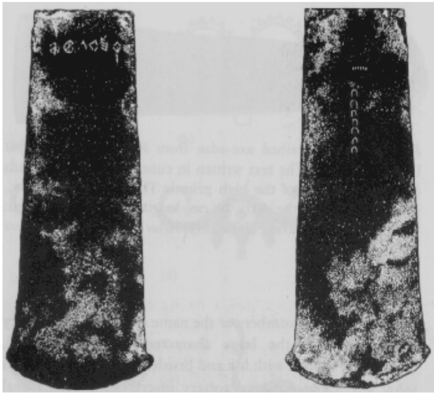
Sakalmer, 16 kms. from Pokaran; the mound of ruins is popularly called Lohagad.h, on the banks of the Sarasvati River. (After Bapat, V.D., and Umapathy, K.R. (tr.), 1994, *Lost' River Sarasvati*, *Mysore*, Bharatiya Itihasa Sankalana Samithi (tr. from Vakankar, L.S. and Parcure, C.N., 1992, *Lupta Sarasvati_ Nadi_ s'odh* (Marathi).



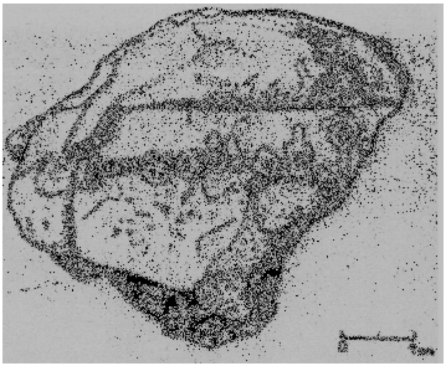
The indentations were, perhaps, an indication of the number of moulds which were prepared in one set into which the molten metal was poured and out of which set the

particular axe is a product. The indentations are apparently made as integral part of the setting up of the mould.

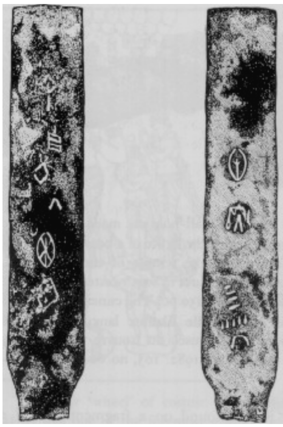
The indentations get modified as U-shaped signs preceded in some instances by short vertical strokes—between one and four. This is seen in an example of two copper axes of Mohenjodaro, with inscriptions on both sides.



The following seal impressions clearly demonstrate the use of seals for trade.



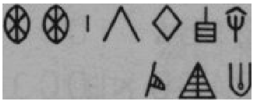
Mohenjodaro, two axes, with inscriptions on both sides. The inverted U-shaped sign occurs 7 times on one axe together with six short strokes; on another axe, the inverted U sign occurs with four short strokes laid out horizontally and five short strokes vertically, clearly representing a system of reckoning.



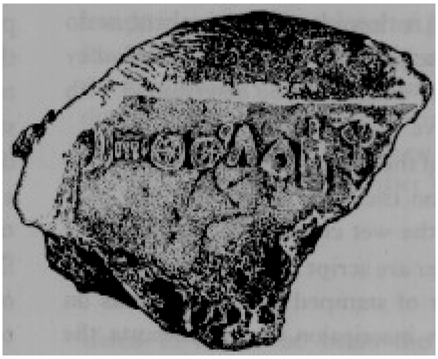
Mohenjodaro: inscribed bronze axe, found as part of a hoard of 56 bronze tools and weapons (DK 7535) (After Parpola, 1994, Fig. 7.8). The inscription:

2925 (Mahadevan)

Mohenjodaro: inscribed bronze dagger, found as part of a hoard of 56 bronze tools and weapons (DK 7856) (After Parpola, 1994, Fig. 7.8). The inscription: 2923 (Mahadevan) (Mackay 1938, II, pl. 126.2; pl. 131, 31; Sind vol. 17, p.80: 403-4; Mackay 1938, II, pl. 85: 119; also shown in M-1384 for comparable inscriptions shown on a seal impression together with the motif of a zebu bull.



Parpola notes that the recurring sequence of seven signs of inscriptions on this axe and dagger are also found on a seal and a seal impression (Parpola, Asko,1994, *Deciphering the Indus Script*, Cambridge University Press, Fig. 7.8):Mohenjodaro: a fragmentary seal (2119) from DK area, G section [After Parpola, 1994, Fig. 7.8). The inscription:
2119 (Mahadevan)



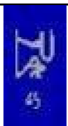
Mohenjodaro, HR Sealing; Seal impression (HR-B, Bl. 8, X, 124); depicts the impression of a huge square seal (about 4.5 cm. square) on a lens of fine tempered clay which is burnt at low temperature. Almost all the ten signs seem to be intact with indications of the ear of a 'one-horned bull' on the right portion of the seal impression. The text of the inscription is similar to the inscriptions found inscribed on bronze weapons (DK 7535, DK 7814) and on a seal with inscriptions above a zebu bull (DK 10551, Mackay 1938 No. 119). DK 7535 is a bronze-blade which is part of a copper-hoard discovered in DK-G, Bl. 12A, I, 15 at a depth of 24.4 ft. The zebu seal also comes from DK-area, but Bl. 26, I,5 and a depth of only 6.7 ft. below surface. The inscriptions on the bronze-weapons as read by Parpola (1975: 184) and tabulated in Ute Franke-Vogt, Inscribed bangles: an inquiry into their relevance, in: Frifelt, Karen and Per Sorensen (eds.), ***South Asian Archaeology***, 1985, Curson Press. Inscribed blades have also been found at Ugarit. "The axe-blades from Ugarit are found in the house of the 'High Priest', and dated 15th-14th centuries BC. (Shaeffer 1939: 107ss, FIgs. 10-103, Pl. XXII-XXIV; For the Ugaritic axes, cf. Pritchard 1954, 81, No. 261). Some of these also occur on inscribed stone bangles. Also found in a hoard they form part of offering gifts to the 'Grand Pretre' (Schaeffer 1956: 269). Inscribed weapons are further reported from Harappa Vats 1940: 384ss, Pl. CXX, 5,19), Chanhu Daro (Mackay 1943: 178, Pl. LXXIV, 1-1a,8) and Kalibangan (Mahadevan 1977:7). Decorated arrowheads are known from the Arabian Peninsula (Donaldson 1984: 257, Fig. 26), but cannot be dated before 1600 BC (pers. comm. B. Vogt)." (Ute Franke-Vogt, opcit, 1985, p. 245).

The practice of inscribing on weapons continued in the historical period. A royal grant was engraved on a copper axe-head. Cf. Balasore copper axe-head grant of Gajapati Purus.ottama (Bhandarkar’s List, No. 1753). During the historical periods, “copper-plate grants were very valuable documents for the donees and their

descendants, since their loss or destruction rendered the revenue-free holdings, created by them, ordinary rent-paying lands unless fresh charters were issued in the place of the old ones. There are instances of charters written on palm leaves or engraved on copper plates being destroyed by fire and the re-issue of copper-plate grants by the later rulers of the territories in question. (See the Kurud plates of Narendra: Epigraphica Indica, Vol. XXXI, p. 267) and the Dubi and Nidhanpur plates of Bha_skaravarman (ibid., Vol. XXX, p. 290). The donees therefore preserved the documents received from the donors generally with special care. Monks dwelling in artificial caves sometimes engraved the texts of the copper-plate grants, received by them in respect of rent-free lands, on the walls of the caves. (See. Proceedings of the Indian History Congress, Lahore, 1940, p. 54 ff.). In the ruins of the ancient city of Valabhi_ at modern Wala in Kathiawar, copper-plate charters have been found immured in the walls or foundations of the houses of the donees or their descendants, while in many places the charters have been dug out from the fields, to the donation of which they refer, usually hidden in small caches made of bricks. Sometimes several documents were preserved together. An urn containing four sets of copper plates was dug out from the ground near the foot of a tree at the village of Andhavaram in Srikakulam District of Andhra Pradesh. (Epigraphic Indiaca, Vol. XXVIII, pp. 175 ff.) The grants were issued by different rulers of different ages to different donees and may have been interred in the ground when the owners left the village at one time on an occasion like pilgrimage. The sets of plates were suspended by means of an iron rod passing through their seal-rings, which was inserted across the deliberately broken rim of the urn having a wide circular mouth. The urn was covered by a hemispherical lid and the plates, kept inside it in paddy-husk, were found in a good state of preservation…The store-room of original grants in a king's aks.apat.ala department is probably called the phalaka-va_ra (literally, 'the store-house of plates') in a Nasik inscription of the 2nd century AD. (Cf. Select Inscriptions, p. 160)." (D.C.Sircar, 1965, *Indian Epigraphy*, Motilal Banarsidass, Delhi: pp. 97-99).

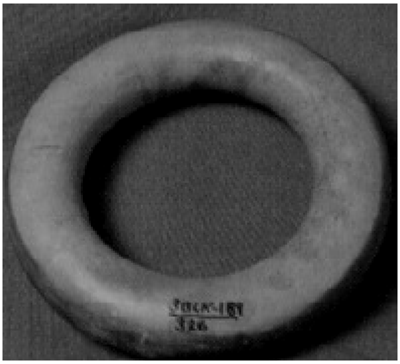
That these inverted U-shapes found on weapon-inscriptions are comparable to wide-mouthed jars can be seen from the Uruk tablets. The inscriptions contain a



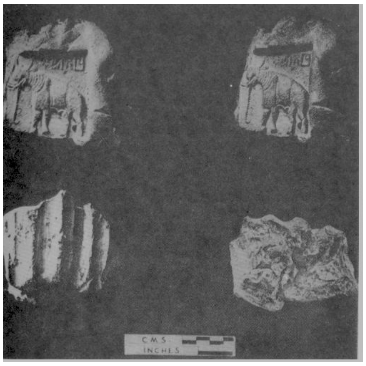


frequently occurring sign, together with long or medium-sized numeral strokes on tablets and seals. Occasionally, this wide-mouthed pot sign is shown as an offering by a kneeling adorant.

Signs 45 and 46 The sign also is depicted in vivid pictorial motifs as an offering person in the presence of a tree-stump or a distinguished person wearing bangles and horned headdress.



Balakot: painted indus script on the inside of a stone bangle (After J.M.Kenoyer, 1998, Fig. 4.19, cat. No. 37).



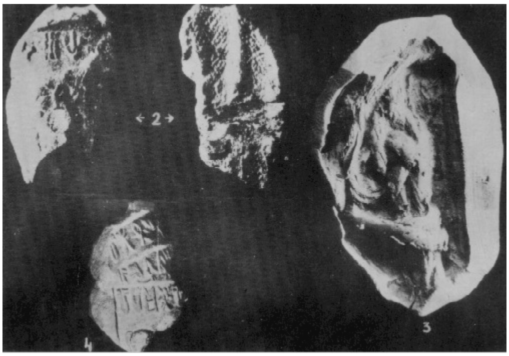
The inscription on the bangle has two signs. This may connote the 'bracelet' of a warrior together with a sword, khan.d.a (or, using the rebus method to read the 'rimmed jar', kan.d.a, kanka, rim of a jar).

Kalibangan: sealing of clay; the sealing shows distinct marks on the reverse of the clay tag of ropes used to seal (packages).

Bales of goods and tin

"In ancient Mesopotamia, seals were impressed upon clay labels fixed on the knots of ropes with which bales of goods were tied, after thay had been wrapped in packing materials. The packets were sealed above all in order to protect their contents against pilfering. On the arrival of goods at their destination, the seals were broken open and the contents weighted and checked, in the presence of witnesses. Cuneiform texts show that it was considered a crime to open a sealed packet in transit: 'From the merchandise transported by I_li_-as'ranni 6 1/3 minas of tin and ½ textile are under the custody of I_labra_tba_ni. He acted high-haandedly and broke open my s'uqlum (i.e. pack of merchandise of standard size or weight) and took my tin. Like a criminal he himself took my own tin! (TC 2,3,4-11, trans. Veenhof 1972: 32) [Loc. cit. Asko Parpola, *Deciphering the Indus Script*, Cambridge, 1994, pp. 113-114].

It may be possible to identify the script sign which connotes, 'tin' by looking at the sign incised on the finds of tin ingots at Haifa, Israel from a ship-wreck. The sign occurs together with other typical signs of the Indian civilization.



Lothal: Terracotta sealings with seal impressions on one side and packing materials on the other. They were used for sealing cargo. (After S. R.Rao, 1991, Pl. XCVIII). There are impressions of multiple seals and impressions of fabric. "The purpose of producing seals was mainly commercial as attested to by 71 terracotta sealings from Lothal. They bear impression of the seal on the face and that

of the packing material such as cloth, reeds and cords on the back. Obviously seals must have been used for sealing cargo wrapped in cloth or bamboo mats and secured by cords. (S.R. Rao, 1985, *Lothal—a Harappan port town, Vol.II,Memoir of the Archaeological Survey of India No. 78*, 305, 319-325). These impressions reveal the whole process of sealing. After wrapping the packages with vegetable mats, reeds or textiles they were secured by tying cords around them. Labels of wet clay covering the knots were impressed with seals in order to authenticate the contents and secure them against pilfering. Thereafter wet clay on the margin of seal-impression was pressed with finger. Perhaps the finger impression was a further authentication of the genuineness of the contents and the source which could be verified by the recipient. Another intering feature of some of the sealings of Lothal is that they bear impressions of more than one seal. For instance, sealing No. 8737 bears impressions of three different seals on its convex face...The sealing No. 1867 was affixed to the stopper of a narrow-mouthed jar. Another sealing circular in plan and bearing impressions of swastika produced by drawing parallel lines in cardinal directions must have been used for sealing a jar received from Brak in the Euphrates-Tigris valley wehre Indus seals and weights are found and a seal of similar motif occurs. None of the original seals affixed on the terracotta and faience sealings has been found at Lothal., nor are sealings of Lothal seals found at the site. The seal-owners of Lothal sealings residing elsewhere exported goods to Lothal and vice-versa is also true." (S.R. Rao, 1991, *Dawn and Devolution of the Indus Civilization*, New Delhi, Aditya Prakashan, 194).

Many clay tags (77) were found from a burnt warehouse at Lothal, many with inscriptions; 21 of these 77 tags bore two, three or four seal impressions. One example of a clay tag with multiple impressions is L-211:



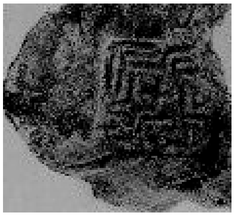
L-211 (Lothal: clay tag with three seal impressions; the bottom impression also shows the profile of the back of a one-horned bull). This is an example of a sealing process which indicates the importance of the inscription (while one impression of the animal

motif is considered adequate) to possibly designate the contents of the package sealed with the clay tag.

The most common impressions found on the clay tags at Lothal are: the unicorn, the elephant and some svastikas.

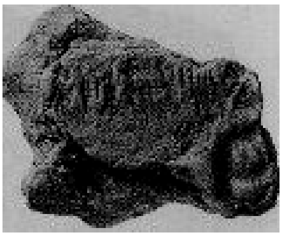


L-174; Lothal: clay tag with two seal impressions, each depicting the pictorial motif of svastika in with the arms counterclockwise.



An impression with the 'cross or PLUS +' motif has also been found:

L-173 (Lothal; seal impression on clay tag; .After A. Parpola, 1986, The Indus Script: a challenging puzzle, *World Archaeology* 17(3) 399-429, London where these 77 tags were analysed). More material has become available. The total number of such tags are



illustrated as L-124 to L-216 (i.e. 93 objects with seal impressions). Parpola (1986) noted that 15 of these 77 tags had an identical inscription (together mostly with the one-horned bull motif):

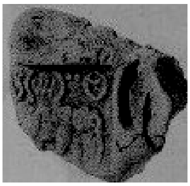


L-126 inscription impressed on a clay tag using a seal which also had the one-horned bull motif(For a transcription of the inscription, see the first item on the following list of nine inscriptions:

Inscriptions (nine) found on 51 clay tags (Lothal) The last item on this list of nine tag impressions is almost identical with the inscription found on a copper tablet from Mohenjodao:

(After Parpola, 1994, group C7 in Fig. 7.14)

The clay tags contains clusters of many signs which also occur on the copper tablets from Mohenjodaro, indicating a possible association with the work of a coppersmith (for e.g. making copper/bronze weapons and tools, which is recurring theme in the process of decipherment unfolded elsewhere).



An inscription on a seal with the elephant motif was also used to impress on 11 clay tags only with one impression: L-161 (Lothal Seal impression on a clay tag). [Note. The first two signs and the seven strokes ligatured in the next sign also occur on the gold pendant incised with 5 signs, perhaps as property lists donated at betrothal. The seal impression may, thus, connote lists of specific metal artifacts as bills of lading].

That the seals could have been used in a trading context is surmised from the following finds at Harappa: In one area at Harappa on Mound F, two groups of identical incised steatite tablets (nine with one set of inscriptions and four with another set) were found along with seals, weights and pendants. This context

signified some association with commodity trade, after weighment. (M.S. Vats, *Excavations at Harappa*, 1940, Delhi, Govt. of India Press, 58-59).



Harappa: cylindrical and twisted terracotta tablets (After J.M.Kenoyer, 1998, Fig. 4.13).

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Discovering the language of India circa 5000 BP

This is a comparative study of lexemes of all the languages of India (which may also be referred to, in a geographical/historical phrase, as the Indian linguistic area).

This lexicon (http://sarasvati.simplenet.com) seeks to establish a semantic concordance, across the languages or numraire facile of the Indian linguistic area: from Brahui to Santali to Bengali, from Kashmiri to Mundarica to Sinhalese, from Marathi to Hindi to Nepali, from Sindhi or Punjabi or Urdu to Tamil. A semantic structure binds the languages of India, which may have diverged morphologically or phonologically as evidenced in the oral tradition of Vedic texts, or epigraphy, literary works or lexicons of the historical periods. This lexicon, therefore, goes beyond, the commonly held belief of an Indo-European language and is anchored on proto-Indian sememes.

The work covers over 8,000 semantic clusters which span and bind the Indian languages. The basic finding is that thousands of terms of the Vedas, the Munda languages (e.g., Santali, Mundarica, Sora), the so-called Dravidian languages and

the so-called Indo-Aryan languages have common roots. This belies the received wisdom of cleavage between, for example, the Dravidian or Munda and the Aryan languages.

The lexicon seeks to establish an areal 'Indian' language type, by establishing semantic concordance among the so-called Indo-Aryan, Dravidian and Munda languages. The area spanned is a geographical region bounded by the Indian ocean on the south and the mountain ranges which insulate it from other regions of the Asian continent on the north, east and west.

This lexicon is a tribute to the brilliant work done by etymologists and scholars of Indian linguistics, and to a number of scholars who have contributed to unravelling the enigma of the Indus (Sarasvati-Sindhu) Script and to the study of ancient Indian science and technology.

The author believes that the work can contribute to/strengthen the unifying elements of Indian common cultural heritage and counter divisive forces which occasionally hold sway. The author also realizes that language is an extraordinarily emotional issue and is subject to a variety of possible interpretations. Language is also a philosophical problem par excellence.

The justification for this comparative lexicon of languages currently spoken by over a billion people of the world can be provided at a number of levels:

(1) to bring people closer to the ancient heritage of a Indian language family of which the extant Indian languages (Indo-Aryan, Dravidian and Munda language streams) are but dialectical forms;
(2) to generate further studies in the disciplines of (i) Indian archaeology, (ii) general semantics and comparative linguistics; (iii) design of fifth-generation computer systems; and
(3) to provide a basis for further studies in grammatical philosophy and neurosciences on the formation of semantic patterns or structures in the human

brain -- neurosciences related to the study of linguistic competence which seems to set apart the humans from other living beings.

The urgent warrant for this work is the difficulty faced by scholars in collating different lexicons and in obtaining classical works such as CDIAL (*A Comparative Dictionary of Indo-Aryan Languages*) even in eminent libraries.

In tracing the etyma (lit. truth in Greek) of the Indian languages, it is adequate to indicate the word forms which can be traced into the mists of history.

Hypotheses on Indian vocabulary: linguistic area

The following hypotheses govern the semantic clustering attempted in this lexicon.

I. It is possible to re-construct a proto-Indian idiom or *lingua franca* of circa the centuries traversed by the Sarasvati-Sindhu doab civilization (c. 3500 to 1000 B.C.).
II. India is a linguistic area nurtured in the cradle of the Sarasvati-Sindhu doab civilization.

The hypotheses reject two earlier linguistic assertions: (i) Sir William Jones's assertion in 1786 of an Indo-European linguistic family and (ii) Francis Whyte Ellis's assertion in 1816 of a southern Indian family of languages. These two assertions have resulted in two comparative or etymological lexicons of the so-called 'Indo-Aryan' and 'Dravidian' languages. This cleavage between the two language families is rejected. The exclusion of the so-called Austro-Asiatic or Munda (or Kherwa_ri) languages is also rejected. Instead, it is proposed that there was a proto-Indian linguistic area (c. 2500 B.C.) which included these three language groups. The underlying assumption is that the so-called Dravidian, Munda and Aryan languages can be traced to an ancient Indian family by establishing the unifying elements, in semantic terms. This echoes Pope's observations made in a different context: '... that between the languages of Southern

India and those of the Aryan family there are many deeply seated and radical affinities; that the differences between the Dravidian tongues and the Aryan are not so great as between the Celtic (for instance) and the Sanskrit; and that, by consequence, the doctrine that the place of the Dravidian dialects is rather with the Aryan than with the Turanian family of languages is still capable of defence... the resemblances (appeared) most frequently in the more uncultivated Dravidian dialects... the identity (was) most striking in the names of instruments, places, and acts connected with a simple life...' (G.U.Pope, Indian Antiquary; loc. cit. R. Swaminatha Aiyar, Dravidian Theories, 1922-23, repr., Delhi, Motilal Banarsidass, 1987, pp.11-12).

Methodology and limitations of the work

The methodology to test the hypotheses will be based on the design of a vocabulary super-set (in semantic terms). The governing principle of this lexicon is that phonetic and grammatical laws are subordinate to semantic laws within a language family. Cognates do not have to be concordant in phonetic and morphological forms; cognates have to be concordant in phonetic and semantic forms to suggest linguistic affinity among dialects of a language family.

Indian Lexicon goes beyond the concept of a comparative lexicon or an etymological dictionary. It is a search for synonyms in ancient forms of Indian languages. Hence, it may be called a semantic lexicon and not an etymological lexicon. This search has taken the compiler 20 years to accomplish using a powerful computer processor to compile the database of semantic clusters, working on an average, for 4 hours daily.

This Indian lexicon seeks to establish a semantic concordance, across the languages or *numraire facile* of the Indian linguistic area: from Brahui to Santali to Bengali, from Kashmiri to Mundarica to Sinhalese, from Marathi to Hindi to Nepali, from Sindhi or Punjabi or Urdu to Tamil. A semantic structure binds the languages of India, which may have diverged morphologically or phonologically as evidenced in

the oral tradition of Vedic texts, or epigraphy, literary works or lexicons of the historical periods. This lexicon, therefore, goes beyond, the commonly held belief of an Indo-European language and is anchored on proto-Indian sememes.

The work covers over 8,300 semantic clusters which span and bind the Indian languages. The basic finding is that thousands of terms of the Vedas, the Munda languages (e.g., Santali, Mundarica, Sora; cf. Munda lexemes in Sanskrit), the so-called Dravidian languages and the so-called Indo-Aryan languages have common roots. This belies the received wisdom of cleavage between, for example, the Dravidian or Munda and the Aryan languages.

Sememes These sememes should be distinguished from dha_tus or verb roots since the radicals span both nouns and verbs and also include attributive thoughts connoted, for example, by adjectives. Many sememes are from Sanskrit which re-inforced the development of the literary structures of historical periods of all the languages flowing from proto-Indian lingua franca. CDIAL (with comparative etymological groups collected over a period of 40 years until 1966) provides thousands of possible derivations or phonological reconstructions of 'old Indo-aryan form' in Sanskrit, within its 14,845 head-words. A magnificent attempt was made in the past by linguists of unsurpassed erudition, to identify the sememes of Indian languages. A notable result was the formation and delineation of the grammatical rules of the Sanskrit language. Indian Lexicon establishes that over 4000 etyma of the Dravidian Etymological Dictionary (DEDR) have concordant sememes in the lexemes of Indo-Aryan and Munda languages, thus negating the linguists' differentiation of the Dravidian tongues from the Indo-Aryan and Munda language streams.

Languages of Bha_rat included in the Lexicon

A.Assamese Ap.Apabhram.s'a Ash. Ashkun (As.ku~_--Kafiri) Aw. Awadhi_ B. Bengali (Ban:gla_) Bal. Balu_ci_ (Iranian) Bashg. Bashgali_ (Kafiri) Bel. Belari Bhoj. Bhojpuri_ Bi. Biha_ri_ Br. Bra_hui_ Brj. Brajbha_s.a_ Bshk. Bashkari_k (Dardic) Bur.Burushaski Chil. Chili_s (Dardic) D.. D.uma_ki Dm. Dame~d.i_ (Kafiri-Dardic) G. Gujara_ti_ Ga. Gadba Garh.Gar.hwa_li_ Gau. Gauro (Dardic) Gaw.Gawar-Bati (Dardic) Gmb. Gambi_ri_ (Kafiri) Go. Gondi Gy. Gypsy or Romani H. Hindi_ Ir. Irul.a	K. Ka_s'mi_ri_ Ka. Kannad.a Kaf. Kafiri Kal. Kalasha (Dardic) Kand. Kandia (Dardic) Kat.. Kat.a_rqala_ (Dardic) Kho. Khowa_r (Dardic) Khot. Khotanese (Iranian) Kmd. Ka_mdeshi (Kafiri) Ko. Kota Kod.. Kod.agu (Coorg) Koh. Kohista_ni_ (Dardic) Kol. Kolami Kon. Kon:kan.i_ Kond.a Kor. Koraga Kt. Kati or Katei (Kafiri) Ku. Kumauni_ Kui Kurub.Bet.t.a Kuruba Kur.Kur.ux (Oraon, Kurukh) Kuwi	L. Lahnda_ M. Mara_t.hi_ Ma.Malayalam Mai.Maiya~_ (Dardic) Malt.Malto Ma_lw.Ma_lwa_i_ Mand.. Mand.a Marw.Ma_rwa_r.i_ Md.Maldivian dialect of Sinhalese Mj. Munji_ (Iranian) Mth. Maithili_ Mu. Mun.d.a_ri (Munda) N. Nepa_li Nahali Nin:g. Nin:gala_mi (Dardic) Nk. Naikr.i (dialect of Kolami = LSI, Bhili of Basim; Naiki of Chanda) Or. Or.iya_	P. Punja_bi_ (Paja_bi_) Pa. Parji Pali Pah. Paha_r.i_ Pa_Ku. Pa_lu Kur-umba Pas'. Pas'ai (Dardic) Pe. Pengo Phal. Phalu_r.a (Dardic) Pkt. Prakrit S. Sindhi_ Sant. Santa_li_ (Mun.d.a_) Sh. Shina (S.in.a_.Dardic) Si. Sinhalese Sik. Sikalga_ri_ (Mixed Gypsy Language: LSI xi 167) Skt. Sanskrit Sv. Savi (Dardic)	Ta.Tamil Te.Telugu Tir.Tira_hi_ (Dardic) To. Toda Tor.To_rwa_li_ (Dardic) Tu. Tulu U. Urdu Werch.Werchikwa_r or Wershikwa_r (Yasin dialect of Burushaski) Wg. Waigali_ or Wai-ala_ (Kafiri) Wkh. Wakhi (Iranian) Wot..Wot.apu_ri_ (language of Wot.apu_r and Kat.a_rqala_. Dardic) WPah. West Paha_r.i_

The words san:ga and tibira which occur in cuneiform inscriptions in Mesopotamia are words which do not represent Sumerian or Akkadian languages but belong to a substrate language of the people who had settled in Mesopotamia or come in as traders. The words san:ga and tibira have cognates in the proto-Indian languages, principally Pra_kr.ts. sa_n:ghvi in Gujarati means a leader of pilgrims; san:ga in Akkadian means a priest. Tibira means a merchant (Akk.); and ta_mba connotes copper (Pali); and in its ancient form, ta_m(b)ra = tagaram, tin. Meluhha = melakka = copper (Pali); hence the land of Meluhha was the land of copper, perhaps a reference to the Khetri mines in Rajasthan on the Sarasvati River Basin. tibira (Akkadian) may indeed connote a tin-smith or one who alloys minerals or metals. The phonetic transformations: tibira, ta_mra, tavara. and trapu. The word ta_mra = of a coppery red colour, made of copper (VS 16.6: ta_mro arun.ah). tamba = copper (Santali.lex.)

This framework hypothesis of a substrate language which links up the imageries of both Mesopotamia and Sarasvati Sindhu River basins will be tested through an organized process of decipherment, presenting the comparable pictorial motifs in the as yet undeciphered cylinder seals of Mesopotamia and the inscriptions of the Sarasvati Sindhu Civilization.

Dialects of the Mleccha

Copper-smelting had to occur on the outskirts of a village. Hence, the semantic equivalence of milakkha as copper.

Mleccha in Pali is milakkha or milakkhu to describe those who dwell on the outskirts of a village. (Shendge, Malati, 1977, The civilized demons: the Harappans in R.gveda, R.gveda, Abhinav Publications). A milakkhu is disconnected from va_c and does not speak Vedic; he spoke Prakrt. " na a_rya_ mlecchanti bha_s.a_bhir ma_yaya_ na caranty uta: aryas do not speak with crude dialects like

mlecchas, nor do they behave with duplicity (MBh. 2.53.8). a dear friend of Vidura who was a professional excavator is sent by Vidura to help the Pa_n.d.avas in confinement; this friend of Vidura has a conversation with Yudhisthira, the eldest Pa_n.d.ava: "kr.s.n.apakse caturdasyàm ràtràv asya purocanah, bhavanasya tava dvàri pradàsyati hutàsanam, màtrà saha pradagdhavyàh pa_n.d.avàh purus.ars.abhàh, iti vyavasitam pàrtha dha_rtara_s.t.ra_sya me šrutam, kiñcic ca vidurenkoto mleccha-vàcàsi pa_n.d.ava, tyayà ca tat tathety uktam etad visvàsa ka_ran.am: on the fourteenth evening of the dark fortnight, Purocana will put fire in the door of your house. ‘The Pandavas are leaders of the people, and they are to be burned to death with their mother.’ This, Pa_rtha (Yudhis.t.hira), is the determined plan of Dhr.tara_s.t.ra’s son, as I have heard it. When you were leaving the city, Vidura spoke a few words to you in the dialect of the mlecchas, and you replied to him, ‘So be it’. I say this to gain your trust.(MBh. 1.135.4-6). This passage shows that there were two Aryans distinguished by language and ethnicity, Yudhis.t.ra and Vidura. Both are aryas, who could speak mlecchas’ language; Dhr.tara_s.t.ra and his people are NOT aryas only because of their behaviour.

Melakkha, island-dwellers

According to the great epic, Mlecchas lived on islands: "sa sarva_n mleccha nr.patin sa_gara dvi_pa va_sinah, aram a_ha_ryàm àsa ratna_ni vividha_ni ca, andana aguru vastra_n.i man.i muktam anuttamam, ka_ñcanam rajatam vajram vidrumam ca maha_ dhanam: (Bhima) arranged for all the mleccha kings, who dwell on the ocean islands, to bring varieties of gems, sandalwood, aloe, garments, and incomparable jewels and pearls, gold, silver, diamonds, and extremely valuable coral… great wealth." (MBh. 2.27.25-26).

A series of articles and counters had appeared in the *Journal of the Economic and social history of the Orient*, Vol.XXI, Pt.II, Elizabeth C.L. During Caspers and A. Govindankutty countering R.Thapar's dravidian hypothesis for the locations of Meluhha, Dilmun and Makan; Thapar's A Possible identification of Meluhha, Dilmun, and Makan appeared in the journal Vol. XVIII, Part I locating these on

India's west coast. Bh. Krishnamurthy defended Thapar on linguistic grounds in Vol. XXVI, Pt. II: *mel-u-kku =3D highland, west; *teLmaN (=3D pure earth) ~ dilmun; *makant =3D male child (Skt. vi_ra =3D male offspring. [cf. K. Karttunen



(1989). India in Early Greek Literature. Helsinki, Finnish Oriental Society. Studia Orientalia. Vol. 65. 293 pages. ISBN 951-9380-10-8, pp. 11 ff et passim. Asko Parpola (1975a). Isolation and tentative interpretation of a toponym in the Harappan inscriptions. Le dechiffrement des ecritures et des langues. Colloque du XXXIXe congres des orientalistes, Paris Juillet 1973. Paris, *Le dechiffrement des ecritures et des langues. Colloque du XXXIXe congres des orientalistes*, Paris Juillet 1973. 121-143 and Asko Parpola (1975b). "India's Name in Early Foreign Sources." *Sri Venkateswara University Oriental Journal*, Tirupati, 18: 9-19.]

Harp-player of Sumer, from a plaque of Khafaje (After Heras, 1953, p. 182). See

Sign 311 of the script:

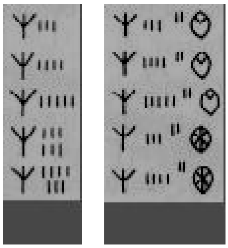


Clay tag from Umma, Iraq; (a) Side 1 bears an impression of a Harappan stamp seal; (b) Side 2 has an impression of cloth. Department of the Ancient Near East (accession no. 1931.120), Ashmolean Museum, Oxford; cf. Parpola, 1994, p. 113).

Seal impression with the cotton cloth from Umma (Scheil, V., 1925, Un Nouvea Sceau Hindou Pseudo-Sumerian, RA, 22/3, pp. 55-56) and cotton cloth piece stuck to the base of a silver vase from Mohenjodaro (Wheeler, R.E.M., 1965, *Indus Civilization*)

are indicative evidence. Babylonian and Greek names for cotton were: sind, sindon. This is an apparent reference to the cotton produced in the black cotton soils of Sind and Gujarat.

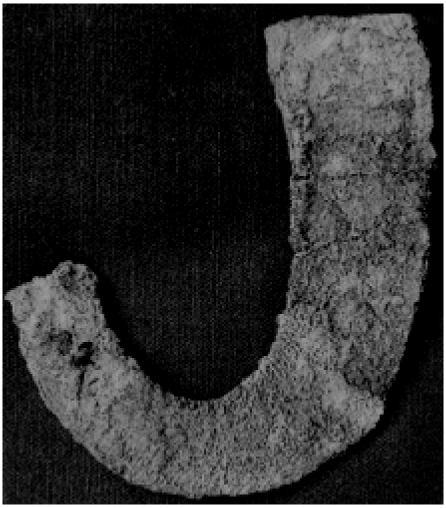
Mleccha trade was first mentioned by Sargon of Akkad (Mesopotamia 2370 B.C.) who stated that boats from Dilmun, Magan and Meluhha came to the quay of Akkad (Hirsch, H., 1963, Die Inschriften der Konige Von Agade, Afo, 20, pp. 37-38; Leemans, W.F., 1960, Foreign Trade in the Old Babylonian Period, p. 164; Oppenheim, A.L., 1954, The seafaring merchants of Ur, JAOS, 74, pp. 6-17). The Mesopotamian imports from Meluhha were: woods, copper (ayas), gold, silver, carnelina, cotton. Gudea sent expeditions in 2200 B.C. to Makkan and Meluhha in search of hard wood.



Some Harappan sign sequences evidence use of numeration:This set of five sign sequences (of seal inscriptions) uses the same sign (Sign 162) with preceding short linear strokes, possibly connoting digits, numbering 3, 4, 5, 6 and 7 respectively. Each of these five inscriptions appears in many duplicates: 5,5,5,7 and 2 respectively. Thus the sign Sign 162 seems to be preceded by varying numerals.

The same sign sequences containing the Sign 162 are preceded by two typical sign groups: a nut motif affixed with two short numeral strokes in the upper register; spoked circle motif affixed with two short numeral strokes in the upper register. This enlarged set of five inscriptions also have duplicates: 6,5,3,2,2 respectively. (See Parpola, 1994, Fig. 7.21)

alaku = number, calculation, cowries as signs of number in reckoning (Ta.); alu cowrie (Kod.)(DEDR 23338).

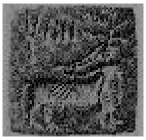


Harappa: curved copper knife, also called razor (After J.M.Kenoyer, 1998, Fig. 7.7).

alaku = blade of weapon or instrument, head of an arrow (Ta.); blade of sword, knife, or spear (Ma.); alagu, alugu – blade of a knife, sword etc. (Ka.); alu~gu = tip of an arrow, sword (Te.)(DEDR 237). Cf. alavu = steel (Tu.); alavuda gat.t.i = bar of steel ; alavuni = to temper, to mix (Tu.)

It is hypothesized that the sets of short numeral strokes connote a count of alaku, or a count of arrowheads: alaku.

This inscription occurs on a seal, where the repetition of the Sign 162 four times is equivalent to the count of four (type of weapon) A sequence of four repetitions of this Sign 162 occurs on an ivory stick. Since another ivory stick contains the same sign 162 suffixed to four short numeral strokes, it is a reasonable assumption that these are two styles of expressing the same idea: four (of



something, a specific commodity,  in this case, a bronze age weapon). The sign 162 (variant) also occurs on a stoneware bangle fratment:

A square stamp seal from Kalibangan depicts this Sign 162 with four numeral strokes together with a ligatured pictorial motif: a person with pig tail, horns of a markhor goat and a headdress with a twig with three leaves is ligatured with the body of a tiger:

Kalibangan (K-050)Kalibangan (K-065; cylinder seal)

The same sign 162 occurs with three numeral strokes in a cylinder seal containing a pictorial motif (K-65): two warriors with a warrior's hairbun are fencing or spearing each other; the two warriors are held by the hand by a person wearing bangles on her arm and a pigtail (the hairdress is comparable to a pendant de3corated with cowry shells and turquoise worn by women of Ladakh) which indicates that this person is a woman also wearing a skirt. Another person with the horns of a markhor goat and headdress of twig with three leaves and wearing bangles on both arms is ligaltured with the body of a tiger. The motif is completed with a tree stump without leaves.

Mohenjodaro: (M-1641A2) stoneware bangle with inscription; sign 169



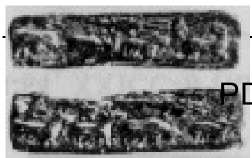
Mohenjodaro: antelope or gazelle motif; Joint expedition of the American School of Indic and Iranian Studies and the Museum of Fine Arts, 1935-1936, Boston, 1997, Museum of Fine Arts (After J. M. Kenoyer, 1998, cat. No. 19)

> ul.e, ule, ure = deer, gazelle (Tu.); ur..ai deer (Ta.); ur..a-ma_n, ur..al-ma_n porcine deer (Ma.)(DEDR 694).
> ul.ai = mane, hair of head (Ta.); ul.a = mane of horse or lion, man's hair (Ma.)(DEDR 701). [Note the human-faced markhor pictograph on some inscriptions which may mean ul.i, battle-axe + (weapon connoted by markhor)].

ul.i = battle-axe, chisel, burin, barber's instrument for paring nails (Ta.); ul.i = chisel, burin (Ma.); id., awl (Ka.); chisel (Tu.); uli id. (Te.Ga.)(DEDR 699).

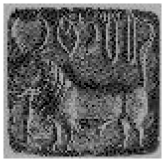
Some pictographs of tiger and antelope turn their head and look back; this may be a way to express a set of weapons, say, axe or battle-axe + a term connoted by looking back, also with a homonym connoting a weapon, for e.g. gohk = looking back; gork = spear.

Mohenjodaro; tablet in bas relief; rows of animals (Marshall, 1931, CXVIII, 10a, b); crocodile snatching a fish is on top on both sides; the row of animals below:

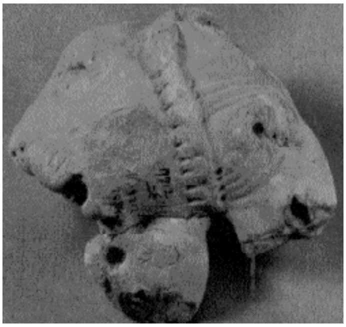


tiger, bison, one-horned bull, ?nilgai; obverse, row of animals: tiger looking back, tiger, rhinoceros, ?elephant

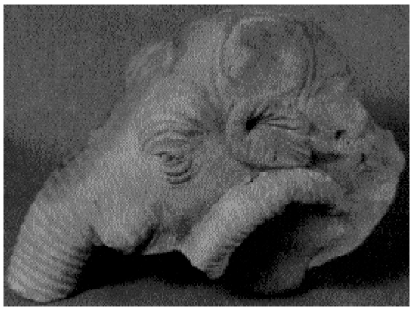
Complex ligaturing of icons and symbolic motifs of animals and body parts of animals, occur on the so-called fabulous animal motif:



Mohenjodaro: M-1177. Multiple creatures combine to create the motif. Rounded human figure has the trunk of an elephant and a draping beard or tusk (?or manes); a pair of inward curving ribbed horns; a heavy mane similar to the one seen on large markhor goats hangs from the neck; the front hooves and genitalia are like those on bull or unicorn motifs; the rear feet and haunches are those of a tiger, striped. The tail is depicted by an upraised cobra. (Fired white, black steatite seal; 1.3 cm. Square; DK 6658; Lahore Museum, L. P-1727).



Nausharo;Ns-7



Nausharo: three-headed animal figure; a tiger with bared teeth, a bull or buffalo head with punctuated hair spots on the forehead; perhaps also an elephant with multiple lines outlining the eyes. (Nausharo. Period III. Harappan, 23400-2200 BC; terracotta, red fired; 6.76 cm. High, 6.97 cm. Long, 4.42 cm. Wide; Nausharo NS 92.02.70.04; Department of Archaeology, Karachi. EBK 7712; Jarrige, C., 1992: 132-5). Nausharo: three-headed animal figure; elephant is seen with a hollow trunk; two horns of a water buffalo curve along the cheeks of the elephant; at the back of the elephant's head can be seen the bottom jaw of a feline with bared teech. (terracotta,

gray, fired; 7.17 cm. High, 10.24 cm. Long and 6.74 cm. Wide; Nausharo NS 91.02.32.01.LXXXII; Department of Archaeology, Karachi. EBK 7423; Jarrige, C., 1992: 132-5).

Luristan legacy of Sarasvati pictorial motifs

Luristan legacy of the Sarasvati Sindhu Civilization is evidenced from the following pictorial motifs which are the hall-mark of the ligaturing system used to convey messages:



Bronze horse-bit of Luristan type,with cheek-pieces showing a sculpturalal ligaturewith an animal's body, wings, and a horned human head.10th - 7th century BC.

Bronze axe- It's socket is head,with it's 7th century B



head of Luristan type. shaped in the form of a stylized lion's mane ending in four animal heads.10th -

Bronze standard 10th - 7th century fights with two one-horned bulls Luristan type, with cheek-pieces ligaturewith an animal's body, head.10th - 7th century BC.

Ligaturing may be a way of weapons, say, battle-axe, dagger and accoutrement of a warrior or armour armourer.



BC. A figure, in the centre (?).Bronze horse-bit of showing a sculpturalal wings,and a horned human

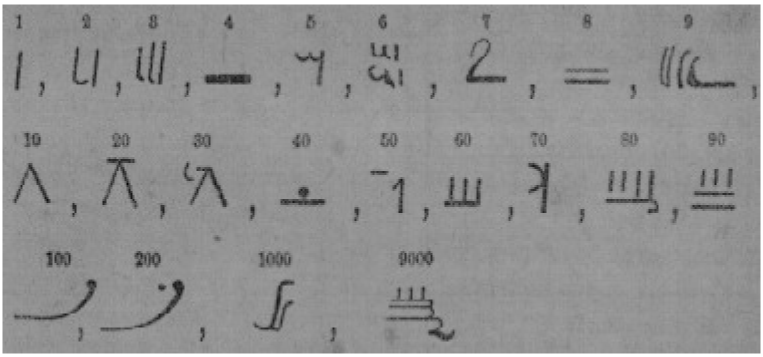
representing a ‘set’ of spear or shield or helmet, as and arms made by an

Repeated sign occurrences on the same inscription also occurs in the use of the Sign 328 (the wide-mouthed, rimless pot) as in the moulded tablet from Harappa

(H-764) Harappa (Tablet: H-764)

Another way of writing one line of this inscription will be: UIII

Thus, the signs 162 and 328 are countable commodities: numbers of particular types of weapon merchandise.



Hieratic signs for numerals; hieratic and demotic writings are supposed to be degeneratge forms of hieroglyphics evolved over time through prolonged use and attempts at rapid writing. (After Cantor, Moritz, 1894, *Mathematische Beitrage zum Kulturleben der Volker*, Halle, Vol. I, pp. 84 and 85). The signs for 10, 20, 30 parallel the ligature motif of

inverted V used in the Harappan script and also the inverted U inscribed on bronze weapons.

There are two types of numeral strokes (long and short). There is also a ligature (affixed on selected signs) which consists of two short strokes but appearing on the upper register. Parpola (1994, p. 82) notes that in the Harappa miniature tablets, the numerals are denoted by long strokes. In many inscriptions of Mohenjodaro and other sites, the long strokes seem to have a phonemic (HOMONYMOUS, predictable) use within inscriptions which tend to use the short strokes to denote numerals. This is surmised from the recurrence of varying number of short strokes in front of the pictograms:

The occurrence of inverted U (or semicircles) is surmised by some as related to the numerals.

Sign 312 Sign 313(inverted U, repeated twice) Sign 314(inverted U, repeated thrice) Sign 315 (inverted U, 7 repetitions);.

Thus the count of ‘inverted U’ signs may be read as connoting say, the specified number of kut.haru or axes. Ku_t.a_ram in Tamil or gud.a_ramu in Telugu, connotes a tent or canopy and is comparable to the shape of the inverted U sign. Or, each inverted ‘U’ may be a count of a copper bun ingot.

In Santali, the cardinal number one can be represented in a number of lexemes; mit, eka, ekam, ekam dukam; and in compounds, t.ak.

In arithmetic, kod.a means ‘one’; gan.d.a/gon.d.a means a set of four (though, pon, ponea, car mean the cardinal number ‘four’).

Collectivity (or grouping) and landing points in numeration: The variations recorded in Santali clearly indicated borrowings and also distinct process of formation of sets of four to count numbers beyond four. The lexeme for representing ‘a whole one’ is got.anak: got.anake idikeda = he took away a whole one; thus got.an, got.ec, got.en are lexemes used with numerals, also with 2,3, and 4 when reduplicated; more~ got.ec hor.ko tahe~kana = there were five people; babar got.an = two each; pepe got.an = three each; popon got.an = four each; thus

the word, 'got.a' means 'the whole'. In a semantic expansion, the term got. also connotes the place where cattle are collected at mid-day.

In the formation of the Harappan script, there are clear indications that 'four' was a landing point in accomplishing groups. In the early indentations noted on bronze/copper weapons (Ahar/Gan.eshwar copper hoards), the dots are marked in groups of 2, 3 or 4. The short-numeral strokes in inscriptions on seals and tablets also indicate groupings in four. 'Thrice' is connoted by 'tihr.a or tebr.a'. Twin is: jawa; twice (over) is: dobor d.an.d.

Numerals (Cardinals)

One ; Skt. Eka; Av. ae_vaIE oiqwo
Two Skt. Dvau; Av. dva; IE d(u)wo
Three Skt. Tray-/tri-; Av.tray-/tri-; IE t[r]i-sr-
Four Skt. Caturi; Av. catwar-/catur-; IE qwetesr
Five Skt. Pan~ca; Av. panca; IE penqwe
Six Skt. S.as.-/s.at.-; Av. s'vas; IE s(w)eks
Seven Skt. Sapta; Av. hapta; IE septm
Eight Skt. As.t.a/as.t.au; Av. as'ta; IE okto_(u)
Nine Skt. Nava; Av. nava; IE newn
Ten Skt. Das'a; Av. dasa; IE dekm

Eleven ; Skt. ekak_das'a; Av.*ae_vandasa IE oiwo-dekm

Twenty to Ninety Skt. –s'at; Av. formed with suffix –sati; IE –kmt (Twenty: Av. vi_saiti; Skt. Vim.s'ati; IE wikmti)

Hundred: ; Skt. S'atam; Av. satem IE kmtom

Thousand Skt. Sahasram; Av. hazanrem; IE sm-gheslom

Ten thousand: Av. bae_van

Numerals (Ordinals)

First: Av. fratema-; Skt. Pratama; IE pro-tmmo
Second: Av. daibitya; Skt. Dviti_ya; IE dwi-ti_yo
Thrid: Av. tritya; Skt. Triti_ya; IE: triti_yo
Fourth: Av. tu_irya; Skt. Tur(i)ya; IE qwturyo
Fifth: Av. puxda; Skt. Pan~catha; IE pnqw-tho
Sixth: Av. s'tva; Skt. S.as.t.a; IE s(e_)ks-two-
Seventh: Av. hapta-ta; Skt. Saptatha; IE septm-tho
Eighth: Av. as'temo; Skt. As.t.ama; IE okto-mo
Ninth: Av. naoma; Skt. Navama; IE newn-ms-
Tenth: Av. dasema; Skt. Das'ama; IE dekm-ms-

Multiplicative

Once Av. hakeret; Skt. Sakr.t; IE smqrt
Twice: Av. bis'; Skt. Dvih; IE dwis
Thrice: Av. tris'; Skt. Trih; IE tris
Four times: Av. carus'; Skt. Catuh; IE catru
Six times: Av. s'vas'
Nine times: Av. naomaya; Skt. Navas'ah

(Misra, Satya Swarup, 1979, The Avestan: a historical and comparative grammar, Varanasi, Chaukhambha Orientalia, pp. 172-177).

Reconstructed basic Munda Numerals

(Zide, Norman H., 1978, Studies in Munda Numerals, Mysore, Central

Institute of Indian Languages,pp. 27-28).

One muXi or MuXiC (with d as the likeliest C)
Two bar or baXr
Three: peX
Four: poXn
Five: mVnlaX(i) (maXnlaX(i)
Six: tVrux (tuXruX)
Seven: guXl
Eight: ta(X)m
Nine: soN-tin
Ten: gaXl
Gorum –kad may be a reflex of an old Proto-Munda '20'.

"I doubt that tigri is a reflex of an old Munda word meaning, specifically, '100', but I know nothing of any sources or other meanings for it...'20' was the denotation for the highest monomorphemic word reconstructible in Proto-Munda...The North Munda forms (Korku isa, Mundari hisi, Santali isi) presumably all go back ultimately to Sanskrit vim.s'ati. All but one of the South Munda forms are version sof kor.i/kur.i, a form also known in Indo-Aryan, very commonly in eastern Indo-Aryan (Bengali, Oriya), but widely distributerd in Indo-Aryan (see Turner, Comparative Dictionary, under ko_d.i. Turner credits Przyluski with proposing the Munda (Austroasiatic) source for ko_d.i). I find kor.i/kur.i dubious for two reasons: the correspondence of o and u in various South Munda languages in this putative cognate set are irregular…If these reasons (or others) are persuasive, we must conclude that kor.i/kur.i is a borrowing in South Munda—from where nobody seems to know, conceivably from the same people from whom vigesimal counting itself was borrowed (but here there would be major problems of geography and chronology to be tackled). One alternative is to derive kor.i/kur.i from an older Munda form, whose only remaining reflex is Gorum –kad." (Zide, opcit., pp. 4-5).

Santali: One to ten: mit, bar, pe, pon, more~, turui, eae, iral, are, gel; twenty: mit isi; eleven: gel mit or gel khon mit

The khon form for eleven is interesting. In the system of silver coin weights, 8 pan.as constitute one kon.a. (One pan.a is a copper coin of weight 80 ratis or 80 cowries).

Dravidian Numerals

(Zvelebil, Kamil V., 1990, *Dravidian Linguistics: an Introduction*, *Pondicherry Institute of Linguistics and Culture*, pp. 24-25).

"…Dravidian numerical system undoubtedly functions in base ten. However, there are traces of octogenal (base 'eight') system, since the compounding bases stop at 'eight', and the root for 'eight' = *en. is perhaps the same (?) as the root for 'count' and 'number' (DEDR 784 and 793). We may speculate that an octogenal system had been in vogue before the Dravidians adopted the decimal system...The reconstructed substantive numeral forms are:

One hundred: *nu_tu; thousand: a_yiram (Tamil); s_sira (Kannada); ca.vrm (Kota); so’fer (Toda) may be a loan word from Skt. Sahasra, but the reverse borrowing is not ruled out.

The following characteristics are revealed from this pattern of using circumgraphs/ligatures:
The long numeral strokes, ‘two’, ‘three’, short numeral strokes ‘seven’ and ‘twelve’ are SUBSTANTIVES, to be read in the rebus method and not directly as cardinal numbers.

The Sign 162 may also connote a **substantive** to be read in the rebus method.

The ‘tusk’ ligatured on Sign 376 Sign 295 Sign 62 may provide a clue that it is a phonetic determinative for the circumgraph of two brackets, **( )** or themselves ligatured into Sign 373 to represent, for e.g., the WHOLE, or a landing point in numeration such as TWENTY, kor.i (twenty); got.a (WHOLE), HOMONYM: kot.t.a (stone of fruit).

The short numeral strokes ‘four’ used as circumgraph may itself constitute a **Substantive** to be read in the rebus method as seen in Sign 105, for e.g. gan.d.a = four which may have a HOMONYM which connotes a **substantive**, such as a sword, khan.d.a. The lexeme may also connote a ‘leader or chief’ depicted as a pictogram Sign 8. When ligatured with)) to form Sign 9 the inscription may be read as TWENTY SWORDS or kor.i gan.d.a

There are indications in the script that some form of ‘grouping’ was used in relation to either numerals or ‘countable’ objuects; see for example, the following signs using circumgraphs as ligatures.

The ligature ^ (and variant) may be a pictogram of an earthenware lid: Santali: dhakno, dhakna, dhaknic = an earthenware lid for a kan.d.a, pot; dhu~r.a~ dhaknic = a small earthenware vessel in which odoriferous resin is burned as incense. The SUBSTANTIVE, homonym: dhakuc bakuc = crooked, lame. Thus, the ligature ^ may be an adjective descriptive of the bronze tool or weapon—curved or crooked, not straight: dhakr.a dhokr.e (Santali) The cognates: ad.ap to be obstructed (OM.)(CDIAL 187-190); ad.d.an.a = a shield (Ka.); at.aippu = shutting, closing (Ta.); ad. Kann to stop, halt (Br.)(DEDR 83). See the pictogram of an earthenware with lid. The earthenware is kan.d.a = sword. With the lid, the sword is described as ‘curved sword’ dhakna kan.d.a. Or, perhaps, the sign ^ connoted a normalized pictogram depicting a pointed, sharp-edged weapon, e.g. an arrow-head (many similarly-shaped arrowheads have been found in many archaeological sites) or an adze; thus the ligatured

sign may connote a sword plus an adze, followed by the ‘tiger looking back’ which may also connote a ligature of tiger + looking back (kr.a_n.d.i + sagr.a = tiger + looking back or axe + chisel).

Following the analogy of a specific number count of inverted U signs which are inscribed on bronze weapons. Sign 315, the inverted U may connote a cardinal number, such as 10 (half of a circle, which is twenty).

Dilmun, Meluhha, Makkan: Translator of the Meluhhan

Substrate language of Sumer and Indian lexemes

A language (in particular as it appears in proper names and geographical names) may show signs of so called substrate languages (like the influence of Celtic on ancient Gaul; compare some Indian geographical names in the US attesting the original inhabitants). Some professional names and agricultural implements in Sumerian show that agriculture and the economic use of metals existed before the arrival of the Sumerians.

Sumerian words with a pre-Sumerian origin are: professional names such as simug 'blacksmith' and tibira 'copper smith','metal-manufacturer' are not in origin Sumerian words. agricultural terms, like engar 'farmer', apin 'plow' and absin 'furrow', are neither of Sumerian origin. Craftsmen like nangar 'carpenter', a:gab 'leather worker' religious terms like sanga 'priest' some of the most ancient cities, like Kish, have names that are not Sumerian in origin.

These words must have been loan words from a substrate language. The words show how far the division in labor had progressed even before the Sumerians arrived.

Sumerian/Elamite inventions: Cylinder seals (French Sceaux-cylindres, German Zylindersiegel) are small (2-6 cm) cylinder-shaped stones carved with a decorative design in intaglio (engraved). Cylinder seals are a typical Sumerian invention. Such seals were also used in the Sarasvati-Sindhu civilization. The cylinder was roled over wet clay to mark or identify clay tablets, envelopes, ceramics and bricks. It so covers an area as large as desired, an advantage over earlier stamp seals. Its use and spread coincides with the use of clay tablets, starting at the end of the 4th millennium up to the end of the first millennium. After this time stamp seals are used again.

Purpose. The seals are needed as signature, confirmation of receipt, or to mark clay tablets and building blocks. The invention fits with the needs caused by the general development of city states.
Many cylinder seals were used in trading moveable property items of the Mesopotamian civilization. [Note that some cylinder seals with the typical (Indus) script pictorials and signs have also been found in the sites of the Sarasvati-Sindhu civilization.]



Clay tablets were used for accounting, literary, administrative documents. [Indianhistorical tradition attests to the use of copper plates for conveyancing property rights.It is notable that some inscriptions are inscribed on copper tablets. So far, no othercivilization has recorded such use of copper plates as recording devices for economic transactions.]

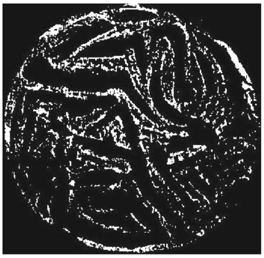
Kalibangan, Rajasthan, India Steatite; Thapar, 1975, p. 28 No. 4; cf. During Caspers, 1982, Pl. 1b, a stamp seal from Mohenjodaro with a similar 'centaur', and Amiet, 1972. Collon, 1987, Fig. 605. This cylinder seal impression shows the duelling figures but with an extra arm; the fabulous animal is also known on a stamp seal from Mohenjo Daro.



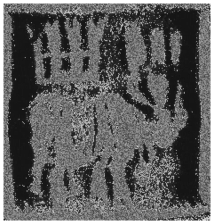
Kalibangan, seal



Terracotta seal,running animal, Sibri, 2800 B.C. (Jarrige)



Terracotta seal, Human figurines, Sibri, 2800 B.C. (Jarrige)



Seal inscribed; Shortugai; Jarrige, 1984, Fig. 126



"A number of Akkadian words, in particular guhlu (CAD 'G': 125; AHw 296) is taken to mean antimony (Sb). Shamshi-Adas V (c. 823-811 BC) mentions that on campaign to the east he crossed the 'mountain of guhlu--mineral' (Meissner 1914). Guhlu is also recorded as tribute in Neo-Assyrian records, from the King of Judah, from Arabia and from Dilmun. Various other Akkadian words used to denote cosmetics or ingredients in glass-making recipes may also mean antimony (cf. Oppenheim 1970: 19 ff.). In Sumerian SU.GAN may refer to antimony (or arsenic). (Moorey, 1994, opcit, pp. 240-1). In India, kohl refers to eye cosmetic or eye-paint. Tigris and Euphrates were called idigna and buranun. Cities: Nippur, Ur, Kish are non-Sumerian words. Among other pre-Sumerian words are those for farmer, herdsman, fisherman, plow, metal smith, carpenter, weaver, potter, mason and merchant.

'One of the most significant and impressive archaeological achievements of the twentieth century centers around the discovery of the ancient Indus civilization which probably flourished from about 2500 to 1500 B.C., and extended over a vast territory from the present Pakistan-Iran border to the foot of the Himalayas and to the Gulf of Cambay... That there was considerable commercial trade between Sumer and Indus land is proved beyond reasonable doubt by some thirty Indus seals which have actually been excavated in Sumer-- and no doubt hundreds more are still lying buried in the Sumerian ruins-- and which must have been brought there in one way or another from their land of origin. There is, therefore, good reason to conclude that the Sumerians had known the name of the Indus land as well as some of its more imortant featues and characteristics, and that some of the innumerable Sumerian texts might turn out

to be highly informative in this respect... According to a long-known Sumerian 'Flood'-story, Dilmun, the land to which Ziusudra, the Sumerian Noah, was transported to live as an immortal among the gods, is 'the place where the sun rises', and was therefore located somewhere to the east of Sumer. In another Sumerian text, Dilmun is described as a blessed, prosperous land dotted with 'great dwellings', to which the countries of the entire civilized world known to the Sumerians, brought their goods and wares...

“The only rich, important land east of Sumer which could be the source of ivory, was that of the ancient Indus civilization, hence it seems not unreasonable to infer that the latter must be identical with Dilmun... there are two faces of the Indus civilization which are especially significant for its identification with Dilmun: the cult of a water deity and sea-plowing ships... the god most intimately related to Dilmun is Enki, the Sumerian Poseidon, the great Sumerian water god in charge of seas and rivers. Thus we find a Sumerian Dilmun-myth which tells the following story: Dilmun, a land described as 'pure', 'clean', and 'bright', a land which knows neither sickness nor death, had been lacking originally in fresh, life-giving water.

“The tutelary goddess of Dilmun, Ninsikilla by name, therefore pleaded with Enki, who is both her husband and father, and the latter orders the sun-god Utu to fill Dilmun with sweet water brought up from the earth's water-sources; Dilmun is thus turned into a divine garden green with grain-yielding fields and acres. In this paradise of the gods eight plants are made to sprout by Ninhursag, the great mother goddess of the Sumerians, perhaps more originally Mother Earth... because Enki wanted to taste them, his messenger, the two-faced god Isimud, plucks these plants one by one and gives them to his master who proceeds to eat them each in turn. Whereupon the angered Ninhursag pronounces the curse of death against Enki and vanishes from among the gods. Enki's health at once begins to fail and eight of his organs become sick. As Enki sinks fast, the great gods sit in the dust, seemingly unable to cope with the situation. Whereupon the fox comes to the rescue and after being promised a reward, he succeeds by some ruse in having the mother goddess return to the gods and heal the dying water god. She seats him by her vulva and after inquiring which eight organs of his body ache, she brings into existence eight corresponding deities-- one of these is Enshag, the Lord of Dilmun-- and Enki is brought back to life and health...

'The land Dilmun is holy, Holy Sumer--present it to him, The land Dilmun is holy, The land Dilmun is holy, the land Dilmun is pure, The land Dilmun is clean, the land Dilmun is holy... In Dilmun the raven utters no cry, The wild hen utters not the cry of the wild hen, The lion kills not... He (the god Enki) cleaned and purified the land Dilmun, Placed the goddess Ninsikilla in charge of it. '

“In fact the very name of the goddess whom Enki placed in charge of Dilmun is a Sumerian compound word whose literal meaning is 'the pure queen'... the Indus civilization depended largely on water-borne trade, coastal and riverine... one of the Sumerian rulers by the name of Ur-Nanshe, who lived as early as about 2400 B.C., speaks of timber-carrying Dilmun boats arriving at his city, Lagash...

“In the myth 'Enki and the World Order' mentioned earlier, Enki boasts of the moored Dilmun boats. Ivory-bearing boats from Dilmun to Ur have already been mentioned; according to the texts these also carried timber, gold, copper, and lapis lazuli. No wonder that in the 'Paradise' myth cited above, Dilmun is described as 'dockyard-house of the (inhabited) land.'...the pre-Indus settlements excavated at Harappa, Kot Diji, or Amri, which could be regarded as the forerunner of the Indus cities and towns with their carefully planned buildings and streets, their water cult and purification rites, their well-developed pictographic script, and their bustling water-borne trade...

“The names of the two great Mesopotamian rivers, the Tigris and Euphrates, or idiglat and buranun as they read in the cuneiform texts, are Ubaidian-- not Sumerian-- words. So, too, are the names of the most important centers of 'Sumer': Eridu, Ur, Larsa, Isin, Adab, Kullab, Lagash, Nippur, and Kish. In fact the word Dilmun itself may, like the word buranun for the Euphrates, be Ubaidian. More important still, such culturally significant words as engar (farmer), udul (herdsman), shupeshdak (fisherman), api_n (plow), apsin (furrow), nimbar (palm), sulumb (date), tibira (metal worker), simug (smith), nangar (carpenter), addub (basket maker), ishbar (weaver), ashgab (leather worker), pahar (potter), shidim (mason), and perhaps even damgar (merchant), are probably all Ubaidian rathern than Sumerian, as has been usually assumed... Another crucial word which may turn out to be Ubaidian, is Ea, one of the two names by which the Mesopotamian water god is known in the cuneiform texts, the other being Enki... while the latter is a typical Sumerian compound with the meaning 'Lord of the Earth', Ea is a word whose linguistic

affiliations are still uncertain... The Assyrian king Tukulti-Ninurta uses in his titles the expression 'king of Dilmun and Meluhha' ... There is another king by the name of Hundaru in whose days booty taken from Dilmun consisted of objects made of copper and bronze, sticks of precious wood, and large quantities of kohl, used as an eye-paint. A crew of soldiers is sent from Dilmun to Babylon to help King Sennacherib raze that city to the ground, and they bring with them bronze spades and spikes which are described as characteristic products of Dilmun... from the myth 'Enki and the World Order', the god Enki boasts of the moored Dilmun boats.

> The lands of Magan and Dilmun
> Looked up at me, Enki,
> Moored (?) the Dilmun-boat to the ground (?),
> Loaded the Magan-boat sky high.

(Samuel N. Kramer, The Indus Civilization and Dilmun: The Sumerian Paradise Land, *Expedition*, Vol. 6, No. 3, 1964, pp. 44-52).

Tilmun, Telmun, Dilmun, the land of the famous red stone

Documents of the Larsa period in Ur were on tablets. Volume UET V includes texts which deal with Ur as the port of entry for copper into Mesopotamia during the time of the Dynasty of Larsa. The copper was imported by boat from Telmun. (Tilmun is associated with the famous red stone, of which Gudea speaks repeatedly as being imported from Meluhha.) "This 'Telmun-trade' was in the hands of seafaring merchants--called alik Telmun-- who worked hand in hand with enterprising capitalists in Ur to take garments to the island in order to buy large quantities of copper there... In our period-- that of the fifth to seventh king of the Dynasty of Larsa-- the island exported not only copper in ingots but also copper objects, beads of precious stones, and-- most of all--ivory...

“Travels to Telmun are repeatedly mentioned in a group of tablets whih come patently from the archives of the temple of the goddess Ningal and list votive offerngs, incoming tithe, etc. The contexts suggest that returning sailors were wont to offer the deity in gratitude a share of their goods. In UET V 526 we read of a small amount of gold, copper and copper utensils characterized as 'tithe of the goddess Ningal from an expedition to Telmun and (from) single persons having gone (there) on their own', during the first 3 months of the year.

UET V 292... listing of merchandise is more extensie; besides' red' gold, copper, lapiz lazuli in lumps, various stone beads, ivory-inlaid tables, et., we find also 'fish-eyes'--perhaps pearls. (The meaing 'pearl' for IGI.HA has been proposed by R.C. Thompson (1936y: 53, n2) on the basis of UET V... The appearance of rather numerous references to IGI.HA in Ur and especialy in connection with imports from Tilmun must be considered an argument in favor of an interpretation which is not based on philological evidence. The lack of archaeological proof for the use of pearls is of course an important arguent against the identification but its value is somewhat diminished when one considers that no ivory object has been found in Ur although the texts report on ivory as raw material as well as on ivory objects.) ...

“UET 78, recording ivory combs, eye-paint and certain kinds of wood, not to mention designations which we fail to understand... UET V 367: '2 mina of silver (the value of): 5 gur of oil (and of) 30 garments for an expedition to Telmun to buy (there) copper, (as the) capital for a partnership, L. and N. have borrowed from U. After safe termination of the voyage, he (the creditor) will not recognize commercial losses (incurred by the debtor); they (the debtors) hae agree to satisfy U (the creditor) with 4 mina of copper for each shel of silver as a just (price(?)].'.. babtum must denote some kind of customs or dues imposed on the merchants by the city administration... all extant Old and Neo-Babylonian contracts on partnership reserve for the tamkarum not only the invested capital (plus interest) but also an equal share of the profit yielded by the business venture... The complex legal relationship between the investing and the travelling merchant has created a number of loan types of which at least two are mentioned in the Code of Hammurabi. One of them uses the characteric term tadmiqtu. We encounter this word in the paragraphs 102-103 of the Code and in a few documents of that period... UET V 428: '5 shekels of silver as a tadmiqtu-loan PN1 has borrowed from PN2. He will return the silver at a moment (yet) to be determined (?) (This) he has sworn by the life of the king.' The specific designation of the loans as tadmiqtu 'favor, kindness' (in Sumerian: KA.sa 'friendly word') should not, in spite of the obvious etymology of these terms in both languages, induce us to presume that this business transaction was not as completely under the sway of the laws of economic life as any other loan...

“As to the main object of the Telmun trade, the copper (termed URUDU), we obtain most of the evidence from the letters (UET V 22,29, 71 and 81) addressed to a certain Ea-na_s.ir, a travelling merchant and importer of Telmun

copper. The metal came in large quantities (UET V 796 mentions more than 13,000 minaz of copper according to the weight standard of Telmun) and often in ingots termed gubarum which weighed up to 4 talents each (UET V 678). The ingots are sometimes qualified as damqu (UET V 22,81) as is also the copper itself (UET V 20 wariam la damqam, but wariam dummuqam in UET V 5 and 6). The quoted passages do not entitle us to speak of refining of copper, because Ea-na_s.ir was not a coppersmith but a merchant and because the meaning of damqum as well as dummuqum as 'good (in quality)' is borned out by such letter passages as UET V 5:28 or 22: 10-13 ('show him 15 ingots so that he may select 6 damqu ingots' ... UET V 81, lines 33-39: 'I myself gave on account of you 19 talents of copper to the palace and S'umi-abum gave (likewise) 18 talents of copper, apart from the sealed document which we both handed over to the temple of Shamash.'...

“Ea-na_s.ir is supposed to have imported a large copper kettle (UET V 5:25)... UET V 428: '1 mina of...silver, 1/2 mina of... silver to buy (precious stones), 'fish-eyes' and other merchandise on an expedition to Telmun, PN2 has borrowed from PN1...'... ivory as raw material (UET V 546) as well as finished ivory objects have been imported from Telmun. Among the latter we find exactly the same objects which we know so well from the dowry inventories, etc. of the Amarna letters: ivory combs (UET V 292, 678), breast plates (UET V 279), boxes (UET V 795), inlaid pieces of furniture (UET 292) and spoons (UET V 795)... Southern Mesopotamia had to rely exclusively upon ivory imported from the East, to be exact: via Telmun... we have from Mohenjodaro actual ivory combs... UET V 82 refers to the karum as a locality in which business accounts have been settled, which in Old-Babylonian practice is normally done in the temple of Shamash... A certain Lu-En-li_l-la_ is said in UET III 1689 (Ibbi-Sin, 4th year) to have received large amounts of garments and wool from the storehouse of the temple of Nanna in order to buy copper in Makkan (nig.s'am.marudu Ma.gan ki, literally: equivalent for buying copper in M.)... When Sargon of Agade proudly proclaims (Legrain 1923: 208f., col. v-vi) that ships from or destined for Meluhha, Makkan and Telmun were moored in the harbor which was situated outside of his capital, this obviously proves the existence of flourishing commercial relations with the East... We even know the name of a person, a native of 'Great-Makkan' i.e. Ur-Nammu (UET III 1193). In the period, Makkan-- 'the country of mines' seems to have been the only importer of copper... After the collapse of the Dynasty of Ur, Telmun replaces Makkan in the Eastern trade of the city... Telmun, as against Makkan, seems never to have completely lost contact with Mesopotamia...

“Telmun had lost contact with the mining centers of Makkan and with those regions which supplied it with stone and timber, etc. some time between the fall of the Dynasty of Larsa and the decline of power of the Hammurabi Dynasty... It turned again into an island famous only for its agricultural products, its sweet water, etc. Copper, precious stones, and rare woods have now to come to Southern Mesopotamia either over the mountain ranges and from the West along the river routes... Sometime in the second half of the 2nd millennium B.C., Telmun seems to have come in closer contact with the rulers of Southern Babylonia (Goetze 1952)... We are fortunate indeed to have three letters at our disposal, two written by Assurbanipal's general Bel-ibni mentioning Hundaru, king of Telmun, and one written by Assurbanipal and addressed to Hundaru. The details of the dealings of the king of Telmun in his fight for survival are of little interest in the present context, far more revealing is the mention of metal (bronze), precious woods and 'kohl' i.e. eye-paint in these letters. We read of great amounts of kohl, 26 talent of bronze, numerous copper and bronze objects, of sticks of precious wood as part of the booty taken from Telmun, while another speaks of the tribute of Telmun mentioning, at the same time, bronze, perfumes and likewise 'sticks' of precious wood offered by merchants from Bit-Naialu... a passage of the inscription KAH 122 of Sennacherib which describes the tools of the crew of corvee-workers sent from Telmun to Babylon to assist the Assyrian king to tear down the city.

“Their tools are characterized as follows: 'bronze spades and bronze pikes, tools which are the (characteristic) product of their (native) country.' Thus, it becomes evident that Telmun has again access to the copper mines of Makkan, to the spices, perfumes and rare woods of the East... Assurbanipal's inscription in the temple of Ishtar in Niniveh mentions another island-- beyond Telmun--: '[x-y]-i-lum, king of the [ ]-people who resides in Hazmani which is an island alongside Telmun' whose messengers had to travel a long way across the sea and overland to Assyria. "(A.Leo Oppenheim, The Seafaring Merchants of Ur, *Journal of the American Oriental Society*, Vol. 74, 1954, pp. 6-17).

People called MAR-TU

Dilmun is a trading post on the 'Lower Sea'. In Mesopotamian mythology, Dilmun is the land of immortality, a favourite meeting place of the gods, which was visited by the hero Gilgamesh in his search for everlasting life. Inscriptions indicate that the ancestors of the Sumerians came from Dilmun,

and it was here that they learnt the art of writing. We agree with S.N.Kramer's observations identifying Dilmun with the Sarasvati-Sindhu (Indus) valley. The God Enki is said to have given his son Inzak dominion over Dilmun. On the Lagash tablet (ca. 2520 BC) is recorded: "The ships of Dilmun from the foreign lands brought me woods". A document of ca. 1800 BC refers to an expedition "to Dilmun to buy copper there'. Sargon of Assyria (710 BC) notes that "he had received presents from the King of Dilmun, a land which lies like a fish, 60 hours away in the midst of the sea of the rising sun".

An Assurbanipal clay cylinder states: Dilmun ki s'a qabal ta_mtim s'apli_t (Dilmun is in the midst of the lower sea) (D.D. Luckenbill, Ancient Records of Assyria, ***ARAB***, II 970. A Ungnad, ***ZA*** 31 (1917): 34, 1.9. That Dilmun was a continental coastland may be surmised from Sargon II's great Display inscription: bi_t-ia-kin s'a kis'a_d na_r marrati adi pa_t Dilmun (Bi_t-Iakin which (extends) from the bank of the brackish river to the border of Dilmun)(Luckenbill, ***ARAB***, 54 = 82 =99). Sargon II's inscription states: Upe_ri s'ar Dilmun s'a ma_la_k 30 be_ru ina qabal ta_mtim s'a nipih s'ams'i ki_ma nu_ni s'itkunu narbasu (Upe_ri, king of Dilmun, whose resting place is 30 double hours away like a fish in the midst of the ocean of the rising sun)(Luckenbill, **ARAB**, 41,70). During the reign of Sargon of Assyria, Dilmun and Magan are stated to be "on the farther side of the lower sea" and there is also a reference to the " sea of Magan" (J.Muhly, ***Copper and Tin***, p. 226; W.F. Leeman, ***Foreign Trade***, p. 81, n.11; M. Weitemeyer, ***Acta Orientalia***, 27 (1964): 207; E. Weidner, **AfO**, 16 (1953): 5, 1.42). The timber for the boats in Bahrain always came from Bharat. The name of the Meluhha-boat is magilum (***Enki and the World Order*** 128).[Boats which plied on the Sindhu river are called mohanna.]

> "(1) Some inscriptions (Luckenbill 1926: Vol. 2, sect. 41, 70, 92 and 185; Cornwall 1944: Vol. 2, sect. 81 and 99) of Sargon of Assyria state that Uperi, King of Dilmun, 'lives a fish 30 beru away in the midst of the sea of the rising sun.'.. (2) 30 beru may refer to the number of hours required to reach Dilmun by sea from the starting point... at a speed of 5 miles an hour a bark would have to travel 600 miles... "(Peter B. Cornwall, On the location of Dilmun, *Bulletin of the American School of Oriental Research*, No. 103, 1946, pp. 3-11).

"The Ninevite Gigamesh Epic, composed probably at the end of the second millennium BC, has Utnapishtim settled "at the mouth of the rivers", taken by all commentators to be identical with Dilmun." (W.F.Albright, The Mouth of the Rivers, **AJSL**, 35 (1919): 161-195).

The mouth of the rivers may relate to the Rann of Kutch/Saurashtra lying at the mouth of the Sindhu and Sarasvati rivers. In the Sumerian myth ***Enki and Ninhursag***, which recounts a Golden Age, paradise is described: "The crow screams not, the **dar**-bird cries not ***dar,*** the lion kills not... the ferry-man says not 'it's midnight', the herald circles not round himself, the singer says not elulam, at the outside of the city no shout resounds." The cry of the sea-faring boatmen in Indian languages on the west-coast is: e_le_lo!

Lines 123-129; and interpolation UET VI/1:

> "Let me admire its green cedars. The (peole of the) lands Magan and Dilmun, Let them come to see me, Enki! Let the mooring posts beplaced for the Dilmun boats! Let the magilum-boats of Meluhha transport of gold and silver for exchange...The land Tukris' shall transport gold from Harali, lapis lazuli and bright... to you. The land Meluhha shall bring cornelian, desirable and precious sissoo-wood from Magan, excellent mangroves, on big ships The land Marhashi will (bring) precious stones, dushia-stones, (to hang) on the breast. The land Magan will bring copper, strong, mighty, diorite-stone, na-buru-stones, shumin-stones to you. The land of the Sea shall bring ebony, the embellishment of (the throne) of kingship to you. The land of the tents shall bring wool... The city, its dwellin gplaces shall be pleasant dwelling places, Dilmun, its dwelling place shall be a pleasant dwelling place. Its barley shall be fine barley, Its dates shall be very big dates! Its harvest shall be threefold. Its trees shall be ...-trees."

We postulate a hypothesis that Dilmun refers to the Sarasvati-Sindhu civilization area and that MAR-TU refer to the people of Marusthali (the present-day Thar-Cholistan on the banks of the Sarasvati river.) In the context of the decipherment of the script inscriptions as lists of bronze-copper weapons, the following analysis based on Uruk texts is significant:

"Almost from the beginning of the excavations in the ruins of the old city of Uruk in Lower Mesopotamia in 1928, work has concentrated on uncovering large parts of the temple area of that city, the holy district of Eanna... It was in these various layers and accumulations of debris covering large parts of the Eanna district that over the years more than four thousand clay tablets and fragments were found... In the Archaic Metals List we again find DILMUN in a line which due to a common denominator proves to be part of an internally cohesive group of entries. The entire list starts out with a sequence of metal vessels and continues with metal tools and weapons. This group opens with a sequence of various daggers, continues with various groups of unidentified objects and from line 23 on shows five entries with the common denominator tun2, 'axe'. The lines read in tentative translation: 'big axe', 'two-handed axe', 'one-handed axe', 'x-axe', and 'Dilmun axe'. Here most likely the differentiation bears on differences in shape, size or function; the 'two-handed axe' may mean a double-edged axe, for instance. Again, if seen as a coherent context DILMUN may be used here as equivalent to 'Dilmun-type axe'. I do not think it could just refer to the provenance of an axe but rather to specific qualities... three texts clearly are dealing with textiles but only one of them has a context which might be interpreted; tentatively it reads' 1 bale of DILMUN garment'... as the title following the one containing the sign for DILMUN we find the comosite sign for namesda, the title of the opening line of the Archaic Professions list. It is supposed that this title represents the highest official. Probably without all connotations of the terms 'ruler' or 'king' it nevertheless should be fairly close. The preceding line contains a number of signs which if translated literally could mean 'the prince of the good Dilmun-house (or temple)'. The exact meaning is elusive. To sum up, from our texts we do not get an adequate picture of the relations of Babylonia, or the city of Uruk, with Dilmun. On a general level, however, we can conclude that not only did such relations exist already by the end of the fourth millennium BC, but that these contacts apparently were not restricted to trade. To be sure, the exchange of metal and textiles may represent the main ties, but the existence of titles containing Dilmun in their name in normal Babylonia contexts like the Professions List point to much closer mutual contacts that would be sustained by occasional trade. The same is suggested by the existence of DILMUN in generic designations for kinds of textiles or metal tools. We certainly are entitled to assume that these relations had existed long before the emergence of writing." [Hans J. Nissen, *The occurrence of Dilmun in the Oldest texts of Mesopotamia*, pp. 335-339].

In the Old Babylonian period, some Mesopotamian seals depict a deity holding a crook. (cf. Seal 124 in Macropoli Collection). The deity also appears with his foot on a gazelle, but sometimes on a small pedestal; he wears a long robe or a kilt and on his head a horned headdress or a tall cylindrical hat. He has been identified as the god AMURRU. In texts and cylinder seal impressions his name is written d/AN.MAR.TU or d/MAR.TU, i.e., AMURRU(M), 'GOD OF THE WEST' in Akkadian. He is often loosely called the god of the Amorites because of his association in texts with the desert and steppe. He became the son of Anu the sky god and was often associated with Sin the moon god. He was referred to as the warrior god. The association with the desert is remarkable. In the Sarasvati Sindhu valley area, the arid zone on the banks of the Sarasvati river is called MARUSTHALI (now called Thar/Cholistan or Great Indian Desert). And, MARUTS are celebrated in the R.gveda as wind-gods, echoing the phenomenon of the 'a_ndhi' or sandstorms common in the region of Thar/Cholistan desert.

"From the Ur III (2112-2004 BC) and Isin-Larsa (2025-1763) periods, we have a number of textual sources which suggest that an ethnic group of people called MAR-TU were associated with the land of Dilmun-- the first of three entities found to be trade partners with Mesopotamia from at least 2500 BC (the others being Makkan and Meluhha). From Drehem, a city near Nippur, we note the occurrence in two texts (dated to AS 2-2044 BC)(CST 254 and TRU 305) of a colophon which reads 'MAR-TU (and) Diviners coming from Dilmun' (or MAR-TU Diviners coming from Dilmun)(BUccellati 1966: 249)... In addition, other evidence suggests that the MAR-TU were associated with (sea) fishing (Civil 1961: Buccellati 1966: 90). Thus Buccellati and later Gelb concluded that the MAR-TU existed in the south in the area of the Gulf as far as Bahrain (Gelb 1968: 43; 1980: 2). Finally, this linkage is suggested by a text from Eshnunna, a Mesopotamian city on the Diyala river. In this text most likely dated to Is'aramas'u (c. 1970 BC) MAR-TU are arranged by segmented lineage affiliation (babtum). The total states that twenty-six MAR-TU are e-lu-tum-me, a term perhaps best translated as meaning' trustworthy' or 'reliable' vis-a-vis the local Eshnunna officials. One MAR-TU from the lineage of Bas'anum is said to be a-ab-ba-ta or 'from the sea (lands)' or the land across the sea (Gelb 1968: 43)... the newely discovered Ibla texts mention the MAR-TU principally in connection with metal daggers (Pettinato 180: 9 and commentary) and prisoners of war (Pettinato 1981b: 120, see text TM 75G.309). (Note also the MAR-TU name Iblanum as meaning man from Ibla, Buccellati 1966: 155, 246)... From the early second millennium BC, we have a much wider body of

evidence dealing with the MAR-TU. This is due to the greatly increased numbers of MAR-TU escaping the hamad and entering the settled zones. As early as S'u-Sin year (2034 BC) we see that a large defensive wall was being built in central Mesopotamia for the express purpose of keeping out the MAR-TU (the MAR-TU wall (called) the one which keeps Didanum away, Buccellati 1966: 92). Unfortunately, by the early reign of the succeeding king, Ibbi-Si, things had changed:

Reports that hostiel MAR-TU had entered the plains having been received, 144,000 gur grain (representing) the grain in its entirety was brought into Isin. Now the MAR-TU in their entirety have entered the interior of the country taking one by one all the great fortresses. Because of the MAR-TU I am not able to provide... for that grain... (Jacobsen 1953: 40)

According to the year date of Ibbi-Sin 17, some of these MAR-TU apparently came from the Gulf region: 'The year the MAR-TU, the powerful south wind who, from the remote past, have not known cities, submitted to Ibbi-Sin, the king of Ur.' (cf. also Gelb's views, 1961: 36)... Oppenheim's review of UET V suggests that Ur apparently served as a focal point and port for foreign trade, specifically with Dilmun (Oppenheim 1954: 8, n.8). A number of texts describe this activity as traders called alik Dilmun sailed to Dilmun and exchanged goods. A number of texts (e.g. UET V 286, 297, 549 and 796) clearly demonstrate that individuals with MAR-TU names were involved in the trade (e.g. in UET V 297 a certain Zuabbaum; in UET V 549 a person named Milkudanum; and in UET V 796 Alazum). This then is a clear link between Dilmun and the MAR-TU-- a hypothesis already formulated from a number of literary texts and Ur III economic records... It seems clear in summary that the MAR-TU were linked to Dilmun in a political sense (rulers in southern Mesopotamian towns), commercial agents in Mesopotamia (alik Dilmun), and inhabitants of Dilmun itself (Susa Tablet, UET V 716).[Juris Zarins, MAR-TU and the land of Dilmun, 232-249 in: Shaikha Haya Ali Al Khalifa and Michael Rice (eds.) Bahrain through the ages: the archaeology, London, KPI, 1986.]

Sir Henry Rawlinson in 1880 suggested that Dilmun of the Sumerian and Akkadian texts might be identified with Bahrain island. This was on the basis of a stone cone found by Captain Durand during an archaeological survey of Bahrain in 1879, but later lost. The text related to the temple of Inzak, elsewhere known as the god of Dilmun. (Captain Durand, Extracts from Report on the Islands and Antiquities of Bahrain, with notes by Major-General Sir.

H.C. Rawlinson, ***JRAS***, N.S. 12 (1880): 189-227, with two maps. Also suggested by Fr. Hommel, ***Ethnologie und Geographie des Alten Orients***, 1904/1926, p. 24, 270.) Since then various identifications have been suggested such as: encompassing Saudi Arabian mainland in the area called Dilmun, Iranian side of the Persian Gulf as constituting Dilmun, Al-Qurna in southern Iraq and the Indus Valley (S.N.Kramer). All these identifications suggest that not all of them are valid for all periods of Mesopotamian history. Throughout Mesopotamian history, however, Dilmun has been an important trade centre, and 'one of the remote areas which was at times within the reach of Mesopotamian political influence. Noticeable among the early texts mentioning Dilmun is that of Urnanshe who had wood transported to Mesopotamia from Dilmun (ca. 2500 BC). In the same early period copper is known to hae been exported from Dilmun to Sumer. About 2100 BC Urnammu of the 3rd dynasty of Ur reopened the Arabian Gulf trade, this time with direct contact with Magan, from which copper was exported to Mesopotamia. The Dilmun trade flourished in the Larsa period (ca. 2000-1763 BC), but then died out. After an interim of 400 years Kassite influence appears in Dilmun (early 14th century BC). It seems that at this time the only export article was dates. Under Sargon of Assyria (end of 8th century BC) Upe_ri, king of Dilmun, is recorded to have sent tribute to the Assyrian empire. In 544 BC, Dilmun disappears from Mesopotamian history when, according to an administrative document, Nabonidus, king of Babylon, had a governor there. Dilmun is also mentioned in Sumerian literary texts as a famous place of prosperity and happiness, and even of eternal life, with the result that comparisons with the Biblical paradise have been made.' (Bendt Alster, Dilmun, Bahrain, and the alleged paradise in Sumerian Myth and Literature, in: Daniel T. Potts (ed.), Dilmun: New studies in the archaeology and early history of Bahrain, Berlin, Dietrich Reimer Verlag, 1983, pp. 39-74). (See also: Daniel Potts, Dilmun: Where and When? ***Dilmun: Journal of the Bahrain Historical and Archaeological Society***, 11 (1983): 15-19; Theresa Howard-Carter, The tangible evidence for the earliest Dilmun, JCS, 33 (1981): 210-223; S.N.Kramer, Quest for Paradise, ***Antiquity***, 37 (1963): 112-113).

On the northern coast of Bahrain, at Barbar, a Sumerian temple, which had been rebuilt three times was found. The dates for the contruction events are estimated to be: beginning of third millennium B.C., middle of the third millennium BC and for the third event, ca. 2200-2000 BC. In the first temple there were two staircases descending to a square well. This was retained in all

the three phases. Peder Mortensen suggested, based on the similarity with the Khafajah and al-'Uaid temples, that the temple was for goddess Ninhursag. The mother-goddess plays an important role in the Sumerian Dilmun myth, Enki and Ninhursag. (Peder Mortensen, ***Kuml*** **1956**: 189-198, **1970**: 385-398).

Indus valley type seals and cubical chert weights were found. (T.G. Bibby, ***Kuml*** 1970: 345-353; cf. Michael Roaf, Weights on the Dilmun standard, ***Iraq*** 44 (1982): 137:141). A bronze mirror handle was also found in the Barbar temple suggesting a link with the Kulli culture in South Baluchistan (N.Rao, ***Kuml*** **1969:** 218-220). "....as far as the third millennium BC is concerned, the cultural relations with the early civilizations in the Indus valley and southern Iran seem to have been much more outspoken than those with Mesopotamia. (M.Tosi, Dilmun, ***Antiquity***, 45 (1971): 21-25). Yet, as far as the early second millennium BC is concerned, a cultural setting has certainly been found within which the identification of Dilmun with Bahrain makes good sense... There is now wide agreement among most, but not all scholars, that from the middle of the third millennium BC, Magan and Meluhha are to be found east of Mesopotamia along the coast of the Arabian Gulf or the Arabian Sea, whereas later, from the middle of the secon dmillennium BC, Egypt, Nubia or Ethiopia must be considered. (I.J.Gelb, Makkan and Meluhha in Early Mesopotamian Sources, ***RA*** 64 (1970): 1-8; E. Sollberger, The Problem of Magan and Meluhha, ***Bulletin of the Institute of Archaeology*** 8-9 (1968-69): 247-250; John Hansman, A Periplus of Magan and Meluhha, ***BOAS*** 36 (1973): 554-587; E.C.L. During Caspers and A. Govindakutty, R. Thapar's Dravidian Hypothesis for the Location of Meluhha, Dilmun and Makan, ***JESHO*** 21 (1978): 114-145.) The cuneiform texts certainly give the impression that at least originally they (Makan and Meluhha) were located in the same direction as Dilmun, but farther away-- and later, remembrance of this direction was demonstrably kept alive, which makes the matter rather complicated. Archaeologically it makes sense to speak of Bahrain as a station on the way to Magan and Meluhha if these two were located east of Bahrain, as the most important cultural relations of Bahrain were Indus and Iran rather than Egypt. The use of Indus measuring standards in Bahrain clearly testifies to this, and was taken for granted by the Mesopotamian traders... The most important suggestins that have been made for Magan are Makran on the Iranian coast, and the Oman peninsula. As copper has been found in the Oman, the latter possibility seems highly likely. This, however, has been questioned by W. Heimpel, according to whom diorite statues of Naramsin and Gudea said to be made of stones from Magan cannot

have come from Oman, because diorite stones big enough for these statues are reported not to exist in Oman. As a possible source he suggests a position 50 miles NNE of Bandar Abbas on the northern side of the Arabian Gulf. Meluhha is to be found along the coast of Baluchistan and the Indus valley.

"...there was a temple of Enzak, the god of Dilmun, on Failaka... it was Failaka that was Dilmun?...the so-called a_lik Dilmun, the sea-faring merchants of Ur... The returning merchants used to offer a share of their goods or a silver model of their boat to the temple of the goddess Ningal, and he texts tell about partnerships and the sharing of profit and losses in a way which would not fit such an easy travel as thaf from Ur to Failaka. The distance from Aba_da_n to Failaka is no more than 60 nautical miles (111 km.) and could hardly be considered a great enterprise... Another possibility would be to suggest that Dilmun was a designation not only of Bahrain, but also of other parts of the Arabian Gulf area, among which Failaka would be counted... Dilmun is likely to the name of a rather large geographical area, including Bahrain, Failaka, Tarut, and certain parts of the Arabian littoral (During Caspers and Govindakutty, ***JESHO*** 21 (1978): 130; cf. the map in D.O.Edzard and G.Farber, ***Repertoire Geographique des Textes Cuneiformes*** 2, Wiesbaden, 1974)..." (Bendt Alster, opcit., 1983, p. 41).

"Around 2500 BC, Dilmun is first referred to as a supplier of wood, by Urnanshe, King of Lagash. His successors, Lugalanda and Uri'inimgina (before 2350 BC) dispensed various textiles, resins, oil and silver out of the state storehouses to merchants of Lagash. The merchants were to trade the goods in Dilmun for copper and other wares, such as onions, linen, resin and bronze 'marine spoons'... During the succeeding Old Akkadian Period (2334-2193 BC) the Mesopotamians were no longer the only traders to visit Dilmun. The seas were open to all contries and seafaring merchants from the distant lands of Dilmun, Meluhha and Makkan tied up at Akkad's quay, during Sargon's reign (2334-2279 BC). Copper was shipped directly from Makkan; people from Meluhha are mentioned in written sources as interpreters and seamen. During the reign of Gudea of Lagash, copper, diorite and wood were delivered from Makkan and Meluhha delivered rare woods (such as Sissoo wood), gold, tin, lapis lazuli and carnelian to Lagash. Naramsin warred against Makkan; Mesopotamia strove for predominance in the area... Ships from Makkan did not sail to the north. It appears that one or more trading centers in Makkan were visited during the voyages where Makkan wares-- chiefly copper-- and luxury

items from Meluhha were bartered. Therefore it appears that many wares referred to in the written sources as 'Makkan goods', actually were materials originally brought from Meluhha. Through trans-shipment in Makkan, these goods were then later referred to as coming from Makkan; the same confusion occurs later with materials from Dilmun... Both the goods and the foreign merchants trading in Dilmun's markets influenced forms of trade. The cuneiform characters had been taken over from the Sumerians, but the system of weights used in barter derived from the Indus Valley culture. (Michael Road, Weights on the Dilmun Standard, ***Iraq***, vol. 44, 1982, 137-141). Spreading out from Dilmun, this system of weights became very popular and was used as far away as Ebla in Syria... Dilmun is mentioned for the last time in written records, during the reign of Samsu'liluma in the year 1744 BC, with the entry...'12 measures of purified copper from Alasia and Dilmun'. With this notice, the new supplier of copper is also mentioned; Alasia (Cyprus) would control the Mediterranean and Near Eastern market for copper for the next millennium. Alasia's rise did not occur in isolation; obviously a lengthy series of crises led to the collapse of the existing system in the East. Unlike Dahlak, Dilmun did not cease to exist; Tukulti-Ninurta refers to himself as 'King of the Upper and Lower Seas' and ruler over Dilmun and Meluhha. However, Meluhha and Makkan are no longer referred to in written records in the old sense.

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Magan and Meluhha. "It has been held in recent years that these terms changed their meaning in the first millennium BC when, rather than referring as before to Oman and the Indus Valley area, they came to denote Egypt and Nubia/Ethiopia. Two distinguished Sumerologists, Jacobsen (1960: 184, n. 18) and Kramer (1963: 276) believed that the two names always referred to regions in Africa. Salles (1989) has recently argued with some force that even in the first millennium BC these terms were still at times used in Assyria and Babylonia in the traditional way. Then they came additionally, not exclusively, to denote regions in southern Egypt and the horn of Africa newly in contact with Mesopotamia whose exotic traded goods (ivory; ebony; tortoiseshell; perfumes and spices) were the same as those coming also from or through

Oman and the Indian subcontinent. Michalowski (1986: 134) has observed, of the earlier period, that places such as Aratta and Dilmun, whether real or imaginary, are the subject of myth and legend while more distant locations documented in administrative records, e.g. Magan and Meluhha are not'. Magan, when mentioned in early texts, is now usually believed to have been a region at the mouth of the Gulf, embracing much of modern Oman and possibly part of the opposite coastal regions of Iran (cf. Potts, 1990: i.133 ff.). Magan's boats reached Sumer in the late third millennium BC and the Akkadian kings claimed to have campaigned there and taken booty, which included stone vessels bearing inscriptions to that effect (Hirsch 1963: 18; Potts, D. 1986; Potts, T.F. 1989). Timber and wooden objects, a type of onion (?), copper, ivory, gold dust, cornelian and other semi-precious stones, diorite, red ochre, as well as goats, were all said to come from Magan, but never lapis lazuli. Some of these goods, notably cornelian and ivory, were being shipped from further east, some, like copper and diorite, were local. Men from Magan are occasionally mentioned in Sumer in Ur III texts. Meluhha is now usually located in the Indus valley region when mentioned in early texts, though it might be of wider reference covering the shores of what in modern times has been called the Indian Ocean. It was a land of seafarers whose boats are mentioned in later third-millennium BC Mesopotamian texts. Its exports included timber and wooden furniture, copper, gold dust, lapis lazuli, cornelian, birds (including the peacock), and such manufactured objects as multi-coloured ivory birds, a cornelian monkey and a 'red dog'. People from Meluhha were also settled in Mesopotamia (Ratnagar 1981: 68 ff.)". (cf. Bibbby 1972: 62; Carter, T.H. 1981; Potts, D. 1990: i.85 ff.) (All references loc. cit. in Moorey, 1994; cf. Moorey, opcit, 1994, p. xxi).

"...the four examples of round seals found in Mohenjodaro show well-supported sequences, whereas the three from Mesopotamia show sequences of signs not paralleled elsewhere in the Indus Script. But the ordinary square seals found in Mesopotamia show the normal Mohenjodaro sequences. In other words, the square seals are in the Indian language, and were probably imported in the course of trade; while the circular seals, although in the Indus script, are in a different language, and were probably manufactured in Mesopotamia for a Sumerian- or Semitic-speaking person of Indian descent..." [G.R. Hunter,1932. Mohenjodaro--Indus Epigraphy, *JRAS*: 466-503].



The Meluhha interpreter in the following cylinder seal is carrying an antelope, which appears to be a nilgai or blue bull. This may be deemed to be the phonetic determinant of the merchandise being traded between Meluhha and Mesopotamia.

Akkadian seal (after Powell, p. 390: *The Bronze Age Civilization of Central Asia*, New York, 1980). The translator of the Meluhhan (Sindhu Sarasvati) language (EME.BAL.ME.LUH.HA.KI) is received by a person of high rank and sitting by his lap. Another Meluhhan sitting by three jars makes a greeting gesture. Two persons enter: one carries an animal, the other a purse. British Museum tablet #79987 enumerates a 'man of Meluhha' named (...)-ibra in a list of foes of Naram-Sin, King of Akkad, ca. 2250 BC. Cylinder seal impression; Legend: S'u-ilis'u, Meluhha interpreter. Louvre AO 22310 (De Clercq Coll.); greenstone; De Clercq and Menant, 1888, No. 83. Collon, 1987, Fig. 637. Parpola (1994, Fig. 8.4) cites the interpretation by Dr. Dominique Collon in a letter of 16 May 1990: "The seal depifcts a seated figure, identifiable by her long hair as feminine and by her horned head-dress (chipped) as a deity. The flounced robe is also generally an indication of divinity. The child on her lap could be the owner of the seal but is more likely to be an attribute of the goddess. The figures approaching the goddess are probably the owner of the seal and his wife although it is possible that these are priestly figures. Several centuries later, in Old Babyl,onian times, it is the king who almost always carries the animal offering but he is probably seeking favourable omens and the deities he approaches are those particularly connected with omens (cf. Collon 1986: III,37). On these later, Old Babyl,onian seals, the figure carrying a situla or bucket is generally a priest but here it is clearly a woman and there is nothing to indicate that she is a priestess or a queen. Both wear Akkadian dress and nothing distinguishes them as foreigners. The significance of the kneeling male figure and the pots behind is difficult to interpret; they could be an attribute of the goddess...Boehmer attributes the seal to his Akkadisch III period—i.e. from Naramsin onwards."

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iconography indicate influences in Makkan down to the level of business organization. Marks identifying pottery in Makkan were taken from those used in the valley, including the use of the signs on pottery used in the valley. The discovery of a sea-port-- which may be ascribed to the Harappans-- at Ra's al-Junayz on Oman's east coast by an Italian expedition would seem to indicate that trade routes should be viewed in a more differentiated fashion than has been done upto now." [Sege Cleuziou, Preliminary report on the second and third excavation campaigns at Hili 8, *Archaeology in the United Arab Emirates, vol. 2/3,* 1978/79, 30ff.; Gerd Weisgerber, '...und Kupfer in Oman', *Der Anschnitt*, vol. 32, 1980, 62-110; Gerd Weisgerber, Makkan and Meluhha-3rd millennium copper production in Oman and evidence of contact with the Indus valley, Paper read in Cambridge 1981 and appeared in *South Asia Archaeology 1981*; Maurizio Tosi, A possible Harappan seaport in Eastern Arabia: Ra's al-Junayz in the Sultanate of Oman, Manuscript]." Gerd Weisgerber, Dilmun--a trading entrepotevidence from historical and archaeological sources, 135-142 in: Shaikha Haya Ali Al Khalifa and Michael Rice (eds.) *Bahrain through the ages: the archaeology,* London, KPI, 1986. [Simo Parpola/Asko Parpola/Robert H. Brunswig, The Meluhha village. Evidence of acculturation of Harappan traders in the later third millennium Mesopotamia?, *Journal of the Economic and Social History of the Orient*, vol. 20, 1977,129-165.

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The acculturation of Meluhhans (probably, Indus people) residing in Mesopotamia in the late third and early second millennium BC, is noted by their adoption of Sumerian names (Parpola, Parpola and Brunswig 1977: 155-159). "The adaptation of Harappan motifs and script to the Dilmun seal form may be a further indication of the acculturative phenomenon, one indicated in Mesopotamia by the adaptation of Harappan traits to the cylinder seal." (Brunswig et al, 1983, p. 110).

Harappan control over the Oman Sea

"...there is no record as to what Sumer delivered to Meluhha...Connections between Sumer and Dilmun are obvious in both directions, especially from

seals; gulf seals in Hili (United Arab Emirates) and Lothal demonstrate the contact between Dilmun and Makan or the Indus Valley civilization. The stone weights found by Bibby in Qalhat al-Bahrain (Bibby, 1970: 372, pl. 18b) prove that far-reaching influence of the Indus Valley in the organisation of commerce in Dilmun by the use of its weights system, together with the original stone weights... site near the village of Al-Maysar... The (copper) ingots have a bun-shaped form which is typical of the third millennium BC and occurs from Tell Chuera in Syria throughout Mesopotamia to Lothal in India (Moorgat and Moorgat-Correns, 1978; *Memoires de la Mission Archeologique de Perse*, 25: 190, fig. 21; Rao, 1963).

"Oman peninsula/Makkan lies half way between the two main civilization centres of the third millennium Middle East: Mesopotamia and the Indus valley... an increasing influence of Harappan civilization on Eastern Arabia during the last two centuries of the third millennium. This influence seems to strengthen during the early second millennium where proper Harappan objects are found all over the Oman peninsula: a cubic stone weight at Shimal, sherds of Harappan storage jars on several sites including Hili 8 (period III). Maysar and Ra's Al-Junayz bears a Harappan inscription and Tosi (forth.) has emphasized the importance of this discovery for knowledge of Harappan control over the Oman Sea." [Serge Cleuziou, Dilmun and Makkan during the third and early second millennia BC, 143-155 in: Shaikha Haya Ali Al Khalifa and Michael Rice (eds.) *Bahrain through the ages: the archaeology*, London, KPI, 1986.]

"The land of Melukkha shall bring carnelian, desirable and precious, sissoo-wood from Magan, excellent mangroves, on big-ships!" said a statement in the Sumerian myth, Enki and Ninkhursag (cf. lines 1-9, trans. B. Alster). "In the late Early Dynastic period (about 2500), Ur-Nanshe, king of the Sumerian city-state Lagash, "had ships of Dilmun transport timber from foreign lands" to his capital (modern Tell al-Hiba), just as a later governor of Lagash, named Gudea, did in the mid-twenty-first century. In the early twenty-fourth century, Lugalbanda and Urukagina, two kings of Lagash, imported copper from Dilmun and paid for it with wool, silver, fat, and various milk and cereal products... That these (round stamp) seals were used in economic transactions is proven by the discovery of two important tablets bearing their impressions. One of these tablets was found at Susa, and dates to the first half of the second millennium. It is a receipt for goods, including ten minas of copper (about eleven pounds or five kilograms). The second tablet, in the Yale Babylonian

Collection, is dated to the tenth year of Gungunum of Larsa (modern Tell Senkereh), that is, around 1925, and records a consignment of goods (wool, wheat, and sesame) prior to a trading voyage that almost certainly had Dilmun as its goal. Dilmun seals characteristically depict two men drinking what could be beer through straws, or two or three prancing gazelles...a merchant named Ea-nasir, who is identified as one of the a_lik Tilmun, or "Dilmun traders"... Ea-nasir paid for Dilmun copper with the textiles and silver that he received from the great Nanna-Ningal temple complex at Ur...The Mari texts contain several references to Dilmunite caravans...Melukkha was a source of wood (including a black wood thought to have been ebony), gold, ivory, and carnelian...Melukkha was accessible by sea...Sargon of Akkad...boasts that ships from Dilmun, Magan and Melukkha docked at the quay of his capital Akkad...While points of contact with other regions are attested, they can hardly have accounted for the strength and individuality of civilization in the subcontinent...Unmistakably Harappan cubical weights of banded chert (based on a unit of 13.63 grams) are known from a number of sites located around the perimeter of the Arabian GUlf, including Susa, Qalat al-Bahrain, Shimal (Ras al-Khaimah), and Tell Abraq (Umm al-Qaiwain)...an inscribed Harappan shard has been found at Ras al Junayz... Harappan pottery has been found at several sites throughout Oman and the United Arab Emirates...A "Melukkhan village" in the territory of the ancient city-state of Lagash, attested in the thirty-fourth year of the reign of Shulgi (2060), may have been a settlement of Harappans, if the identification with the civilization of the Indus Valley is correct...But...there is little evidence of a Sumerian, Akkadian, or Babylonian presence in the Indus Valley... That the language of Melukkha was unintelligble to an Akkadian or Sumerian speaker is clearly shown by the fact that, on his cylinder seal, the Akkadian functionary Shu-ilishu is identified as a "Melukkhan translator"...the word "Melukkha" appears occasionally as a personal name in cuneiform texts of the Old Akkadian and Ur III periods. " (Potts, D., 1995, Distant Shores: Ancient Near Eastern Trade, in: Jack M. Sasson (ed.), *Civilizations of the Ancient Near East*, Vol. I, pp. 1451-1463).



Mohenjodaro: rectangular terracotta tablet; motif of a tree with a platform; the motif could be a walled grove containing an acacia tree; the entrance to the grove has a pillar whose capital is the woman with the buffalo head-dress; reverse shows deep impression from a mat , indicating that some seals had a trading purpose. (Mackay, 1938: pl. CIII, 8-10).

The following are examples of the continuity of the Harappan tradition into the historical periods—the tradition of depicting motifs representing weapons on seals. The sculptures of devas are also represented as carrying weapons to symbolize their attributes of valour. Many of the motifs depict the 'humped bull' which is a dominant motif on Harappan inscriptions. The owners of the seals apparently were of the ruling clans or sena_patis orf commanders of the army of the rulers. There are instances where even the kings are titled as sena_patis.



A sealing found in the excavations conducted at Vais'a_li (ca. 1st century BC) with the Bra_hmi legend: agimita...miyaye...kot.ha(t.a) ka_rasa vit.hi (vithi); the sealing has two symbols: (1) tree with railing; and (2) Ujjain symbol. The entire legend is interpreted as: (seal) of the market or shop (owned by) the fort commander or the store-keeper who was a relation through the maternal uncle of king Agnimitra. (*Journal of the Bihar Research Society*, XLV, p. 314).





"Numerous clay sealings from Rajghat, now in different museums and collections, bear the device of a bull standing to the left with a yu_pa in front and a spear to its back. Above these occurs the legend Dhanadevasya and below ra_jn~o in circa second century AD characters. Beneath the head of the bull is a three-arched hill symbol and a chakra above its hind part.

"Another sealing from Rajghat with the device of a bull flanked by a vase on the left and paras'u on the right...The legend Dhanadevasa occurs in characters slightly earlier than on those described above...The Kaus'a_mbi rulers issued their own coinage and may or may not have owed nominal allegiance to the Kus.a_n.as



"A Rajghat sealing has, in the center, the legend Ra_jn~a Navvasya in ca. 2nd or 3rd century AD, flanked by a spear on

the left and a yu_pa on the right. Below is a pile of balls. The ruler may be identified with Nava of some Kaus’a_mbi coins...In the opinion of Jayaswal, Nava was the founder of Navana_ga dynasty mentioned in the Pura_n.as





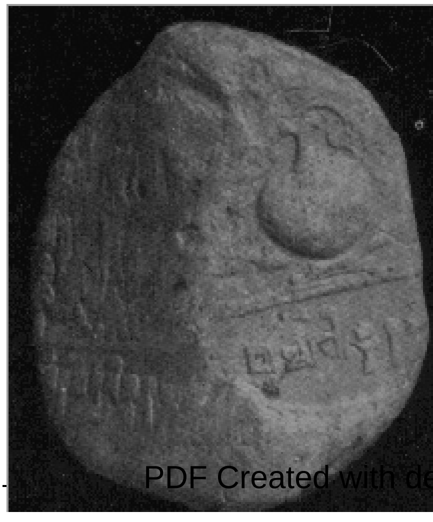
”...Ayodhya kings...A sealing shows a bull standing, facing left, with a trident-battle-axe in front as on the seal of Vis.n.umitra. The prongs of the trident in this case are curved outwards. Behind the bull, is a symbol, perhaps a yu_pa within railing, its upper part being out of flan. The two-lined legend (one above and other below the bull) reads: vijayamitraputrasya; ‘sivamitrasya.



“A sealing bears a bull standing to left, facing a trident-battle-axe within a railing in front and the legend Bhavasenaputrasya and Vis.n.umitrasya above and below the bull respectively in ca. first or second century AD characters.



“...A sealing bears an ornamental nandipa_da on railing-type pedestal with a standard-like symbol on either side. The legene below in ca. first or second century AD lettering reads: pus.yamitrasya.



“...Kings of the Magha dynasty...A sealing, a circular one from Bhita, has a bull, stqanding to left, with a woman standing in front. Behind the bull is a post or a thunderbolt. The legend reads: (ra_)jn~a va_s(i)s.t.h(i)putrasya s’ri_ bhi_masena(sya)—of the illustrious ra_ja_ va_sis.t.hi_putra bhi_masena, in ca. second or third century AD characters.

“The Army...Bala_dhikaran.a. A sealing from Ahicchatra in the Antiquity section of the Archaeological Survey of India, New Delhi (No. 4451) shows a vase and foliage motif and the legend bala_dhi in Gupta characters. This sealing, in all probability, belonged to a bala_dhikaran.a. One of the impressions on a lump from the same site in the same collection has a similar device and the legend bala_dhikaran.a in characters of the same period. Another impression is that of kuma_ra_ma_tya_dhikaran.a.



“...Another Basarh sealing (Indian Museum No. A11315-NS 6159) has the device of a vase with foliage in the center, a s’an:kha to the right and the letter s’ri_ to the left. The legend reads: yuvara_ja bhat.t.a_raka pa_di_ya bala_dhikaran.asya—military office attached to the yuvara_ja bhat.t.a_raka (alternative reading: of the office of the commander-in-chief, equal in rank to the heir-apparent; of his highness the yuvara_ja and bhat.t.a_raka, the chief of military forces: *ASIAR*, 1903-04, p. 108)..Vase seems to be the common device of the office of bala_dhikr.ta although a bala_dhikr.ta could use another symbol in his personal capacity. ”(Thalplyal, K.K., opcit., pp. 25-26; Bha_rat Kala Bhavan, Varanasi, no. 649).

The association of the vase with the army or bala_dhikaran.a is instructive. A jar similarly shaped appears on the exquisite Mohenjodaro pectoral with a display of overflowing water from the vase, accompanied by the one-horned bull and the ‘standard device’ in front. It will be elaborated that the rimmed jar connoted kan.d.a a rebus representation of khan.d.a, sword. [cf. ba_l., ba_lu = a pointed, double-edged, short knife tied to the foot of a cock in cock-fighting; a razor (Tu.lex.)].

It is suggested that the nandipa_da motif is comparable to the buffalo-horned seated person on Harappan inscriptions and that the standard-like symbol on either side of the Pus.yamitra sealing is comparable to the standard device which normally appears in front of the one-horned bull on Harappan inscriptions. It is, therefore, surmised that the lexemes associated with these recurring, continuing motifs as the Harappan legacy are consistent with the lexemes in use for bronze-age weapons in the historical periods. The use of the vase to represent the bala_dhikr.ta is significant, in the context of the decipherment of the 'vase' or rimmed jar motif as a generic lexeme connoting the category:'WEAPON', karuvi; kan.d.a ka[r]n.aka = sword.

Daimabad: inscribed terracotta seal, Late Harappan (After Sali, 1984, Pl. 91). The sign depicting the motif of a rimmed jar is the most frequently occurring in the inscriptions of the civilization in all cultural phases.

The set of lexemes presented below indicate two semantic streams: one representing copper work or work of a brazier and the other representing the bronze/copper weapon or tool.

> kan- = copper work, copper, workmanship; kan-n-a_n- brazier (Ta.); kanna_n brazier (Ma.)(DEDR 1402). khani = ore (Skt.); khan = mine (Santali)
> karuvi = instrument, tool (Ta.); kari, karivi, karuvi, karu = tool, plough, weapon (Ma.)(DEDR 1290).



Both the semantic streams are connoted by the pictogram: the rimmed jar with a narrow neck. The artifacts found in comparable shape, i.e. in a shape comparable to the pictogram are significantly made of copper or silver from Mohenjodaro and from Sind.

Mohenjodaro: copper vase (Marshall, 1931, pl. CXLI: 2; ASI: 614/85)

The focus is on the rim of the vessel in the orthography of the pictogram:

> kan:kha = rim of vessel, brow of hill (Santali); kan.d.a kankha, kan.d.a kan:kha = rim of a waterpot (Santali)
> kan.d.a = waterpot of a certain size and shape (Santali)

Thus the meaning connoted by thepictogram,

Sign 342 is: tool/weapon (made of copper/bronze). Speaking the the language of the civilization, the pictogram (Sign 342) is: kan- karuvi = bronze weapon (Ta.Ma.); khan.d.a = instrument, implement, weapon (Santali)

If the pictograph is read as, ‘kan.d.a kanka’, it connotes, khan.d.a kan (ka), a sword (of copper).

Sign 342 and variants
Foot of any vase-shaped vessel, rim

> kan.d.u; ka_n.t.am (Ta.) = pot (IL 1692)
> ka_nt. = rim ka_n.a_; kano = rim; kanna_ = edge, rim, handle (IL 2280).



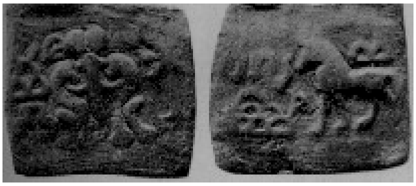
This interpretation of the legacy of the a_yudhaji_vin, kut.ha_ra (armourer), metal-worker, metals trader, warrior of the Harappan civilization is reinforced by the use of Harappan motifs on punch-marked coins. The mints of the historical periods could be considered a legacy of the art of braziers and lapidaries of the Harappan civilization. The extraordinary legacy continues in the unique system of copper plate grants to record property transactions and transactions with the temples. Only a brazier had the competence to inscribe on

copper plates, the metal-worker who had invented the writing system of the Sarasvati Civilization.

Taxila. Copper. Single-die coin, ancient India; the motifs which echo the Harappan inscriptions are: tree in railing, svastika, the squares within a square; (?) U-shaped sign. Anterior to Alexander. (After Cunningham, A., 1891, *Coins of Ancient India*, (Repr.), Delhi, Asian Educatgional Services, Pl. II, 8)

The inscriptions of the civilization contain over 50 svastika signs. On one Harappan tablet, there are five svastika's in a row alternating between right-handed and left-handed varieties. Harappa tablet (H-182)

The sign sequence containing two strokes and a pair of bangles motif is followed by five svastika on one side and by a drummer in front of a tiger on the obverse. The inscription is the same on both sides of the tablet.



Taxila. Copper. Double-die coin, ancient India; obverse has the motif of an elephant , full-front, between a caitya and a bodhi (papal) tree; the two ears of the elephant are spread out to the right and left of the lobes of the head, the trunk hangs down in the middle with a tusk on each side while all four legs are displayed; the symbols on the other side are: one-horned bull, three hills. Anterior to Alexander. . (After Cunningham, A., 1891, *Coins of Ancient India*, (Repr.), Delhi, Asian Educatgional Services, Pl. III, 5)

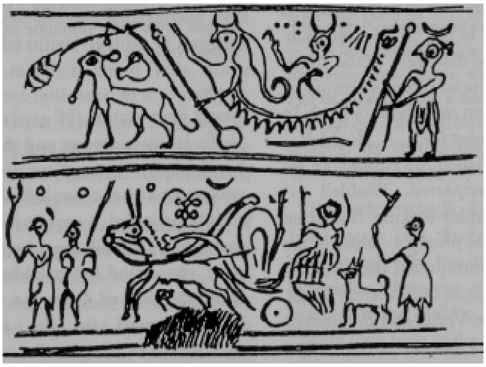
The numeration used is also reminiscent of the system or reckoning seen on Harappan inscriptions with the base 4.

4 cowries = 1 gan.d.a (cf. gan. To count)
20 gan.d.as = 1 pan.a = 144 gms. of copper
(Also, 80 rati seeds in weight or 80 cowries equal one pan.a)
4 pan.as = 1 tan:gka or ana = 14 gms. of silver
4 tan:gkas = 1 kahan or karsha = 56 gms. of silver

The scale of copper coins:
½ ka_kin.i = 10 ratis (9 grains)
1 ka_kin.i = 20 ratis
1 pan.a or ka_rs.a_pan.a = 80 ratis
The scale of silver coins:
tan:gka or pa_dika =4 pan.as = ¼ ka_rs.a = 8 ratis (14.4 grains)
kon.a = 8 pan.as = ½ ka_rs.a = 16 ratis
ka_rs.a_pan.a, dharan.a, pura_n.a = 16 pan.as = 1 ka_rs.a = 32 ratis
s’atama_na or pala = 100 pan.as = 10 ka_rs.as = 320 ratis
The scale of gold coins:
1/10 hu_n = fanam = 5.28 grains
¼ hu_n = ma_da = 13.20 grains

½ hu_n = prata_pa = 26.40 grains
1 hu_n = hu_n, vara_ha, pagod.a = 52.80 grains
1 ka_rs.a = 57.60 grains (Full weight)
1suvarn.a = 144.0 grains
1 nis.ka, pala or s’atama_na = 576 grains

(After Cunningham, A., 1891, *Coins of Ancient India*, (Repr.), Delhi, Asian Educatgional Services).



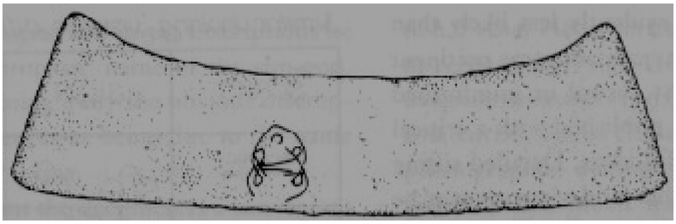
The script also uses slanted linear strokes. There is a lexeme in Santali which provides a homonym for an oblique pictogram, a slanted stroke:

gan.d. gan.d. across, at right angles, transversely; gan.d. gan.d. ar.eme throw embankments across at several places ; gan.d.e to place at a right angle to something else, cross, transverse(Santali)

Sign 93 This sign can be read as gan.d. PLUS a lexeme which is a homonym of the Indic word connoting a count of ‘two’

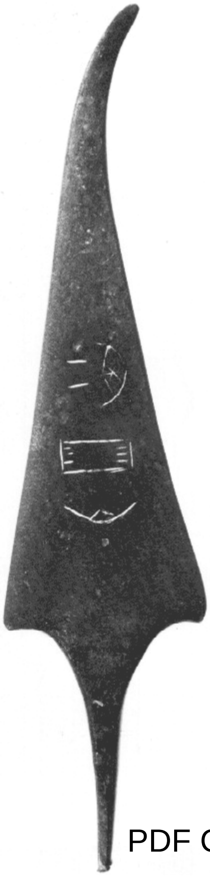
In Old Celtic, a dot ● or a horizontal stroke__ represented the number ten; a slanted or oblique stroke / represented 100; a ◆represented 1,000. (cf. Crozer, V.S., 1968, *A survey of Mathematics*, New York).

ayer kapi [ayar, ayar ayar = oblique, obliquely, not at right angle; ayar, ayar ayar = straight, applied mainly to implements which should be more or less curved]. Ayar kapi = straight big axe.



Alternatively, the slanted linear stroke may connote the lexeme, gan.d.a, or a set of four, a landing point in numeration.

A pictograph of an 'endless knot' which occurs on copper tablets also occurs on an axe-head or knife, thus indicating that the sign is apparently relatable to a weapon or metallic tool. That it may relate to a warrior is surmised from its appearance on a battle-car pictograph of a Sumer cylinder seal.



Mohenjodaro: copper tablet (Mohenjodaro Museum MD 50.420, MM 554; Shah and Parpola, 1991: M-1457). The endless knot design and relate3ed forms are also found on some seals in Mesopotamia.

Rojdi, Gujarat; inscription on one side; obverse has the endless-knot motif. The endless knot motif has appeared on a copper axe-head or knife of copper from the site; length 17.4 cm.; early second millennium BC. (Gregory L. Possehl, and M.H. Raval, 1989, *Harappan Civilization and Rojdi*, NMNew Delhi, Oxford and IBH and AIIS, 162, fig. 77).

Sumer: impression of cylinder seal (ca. 2500 BC) with 'endless knot' motif. (After Amiet, Pierre, 1980, *La Glyptique mesopotamienne archaique*, 2nd edn., Paris, pl. 108, no. 1435). This pictograph linking the 'endless knot' with the chariot has been elaborated further in the context of the evolution of chariots in Mesopotamian and Indian civilizations.

A spoked wheel with two short strokes superimposed by an inverted U may connote the canopied two-spoked-wheeled chariot. The ligatured sign occurs together with the pictograph of a Zebu or Bra_hman.i bull and also inscribed on a weapon, an apparent indication of the importance attached to the weapon connoted by the ligatured sign, i.e. the canopied battle-car. The spoked-wheel sign may connote a sagar., a car.

3080 (zebu bull) 1016 (zebu bull) 4902 (one-horned bull)

4901 (one-horned bull). The same inscription is found on two bronze daggers with a curved point and also (fragmentarily) on a bronze axe blade. Both these weapons were found in the hoard of weapons and tools found at Harappa (in a jar with 20 axes, 9 daggers, 14 spealrheads, 1 macehead, 10 chisels, 2 saws). If the lexeme related to the one-horned bull has a homonym which can describe a curved dagger, the appearance of an identical inscription on a seal with the one-horned bull motif and also on curved daggers can be logically explained as: a curved dagger PLUS three other copper/bronze weapons.



Harappa bronze daggers (H-380, H-381) inscribed with an identical inscription.

The use of the   rebus methodology

is justified on the following evidence and analysis:

According to the Parpola concordance which contains a corpus of 2942 inscriptions, 300 inscriptions are composed of either one sign or two signs. Many signs occur in predictable pairs; 57 pairwise combinations account for a total frequency of 3154 occurrences (32% of 9798 occurrences of all pairwise combinations). Given the statistical evidence that the average length of a text is 5 signs, it is apparent that one sign or a pair of signs represents a ‘substantive category’ of information, i.e., a complete message.

In addition to the field symbol, the texts of the inscriptions are composed of an average of five signs. The longest inscription has 26 signs (found on two identical three-sided tablets: M-494 and M-495 of Parpola corpus).

There are over 170 inscriptions with only one sign (in addition to the field symbol); about 30 inscriptions have only two signs (Sepo Koskenniemi et al., 1973, p. x)

A number of signs appear in duplicated pairs: for example,

Sign 245 occurs in 70 pairs. (Sign 245 represents nine squares in a rectangle or a chequered-rectangle)

These are apparently not duplicated alphabets or syllables.

Many pictorials in inscriptions in field symbols also occur in pairs: two tigers, two bisons, two heads of the unicorn.

These statistics establish the following facts:

A combination of pictorials without the use of any sign constitute the message. One or two signs and/or a pair of signs are adequate to compose the core of the messages.

This leads to the apparent conclusion that the solus sign or each sign in a pairwise combinations (which constitute the core of information conveyed) is not an alphabet or a syllable, but a WORD.

This apparent evidence is echoed in Koskenniemi et al: "... the Indus script is in all likelihood a relatively crude morphemographic writing system. The graphemes would usually stand for the lexical morphemes... This hypothesis is based on the approximate date this writing system was created (circa 26th century B.C.), the parallel presented by the Sumerian writing system of that time (the Fara texts of the 26th century), the brevity of recurring combinations, and the number of different graphemes." (Koskenniemi and Parpola, 1982, pp. 10-11). Another echo is found in the structural analysis of Mahadevan: " G.R. Hunter (1934, p. 126) formulated a set of criteria for segmentation of the texts and found that almost every sign of common occurrence functioned as a single word. The Soviet group (M.A. Probst and A.M. Kondratov in Y.V. Knorozov et al., Proto-Indica, Moscow, 1965) analyzed texts on the computer and concluded that the Indus script is essentially morphemic in character, resembling the Egyptian hieroglyphic system in this respect. I have described the logical word-division procedures developed by me (I. Mahadevan, "Recent advances in the study of the Indus script", Puratattva, Vol. 9, p. 34), which show that most of the signs of the Indus script are word-signs... no one has so far been able to establish by objective analytical procedures the existence of purely phonetic syllabic signs in the Indus script... Phonograms formed by the rebus principle can be recognized only if the underlying language is known or assumed as a working hypothesis. Since the identity of the Harappan language has not yet been established beyond doubt, it cannot be said that any phonogram has been recognized with certainty... It is however very likely that there are rebus-based phonograms in the Indus script, as otherwise, it is very difficult to account for the presence of such unlikely objects such as the fish, birds, animals and insects in what are most probably names and titles on the seal-texts. It is likely that the Indus scrip resembles in this respect the Egyptian script in which pictographic signs serve as phonetic signs based on the rebus principle (e.g. the picture of a ‘goose’ stands for ‘son’ as the two words are homonymous in the Egyptian language). It is no always possible in the present state of our knowledge to distinguish between ideograms and phonograms..." (I. Mahadevan, "Towards a grammar of the Indus texts: ‘intelligible to the eye, if not to the ears’, Tamil Civilization, Vol. 4, Nos. 3 and 4, Tanjore, 1966, pp. 18-19).

Orthography and analysis of some grapheme sequences

Parpola notes (1994, pp. 84-85), echoing similar observations by Mahadevan: "…a few signs are indeed found mostly at the end of inscriptions, notably sign 342 (‘jar’ grapheme)and sign 211 (‘arrow’ grapheme) and they are major aids in the segmentation of texts. The sign 342 (‘jar’ grapheme) is by far the most common sign of the Indus script, representing about 10 percent of all sign occurrences. About one-third of all inscriptions end with this sign…the sign is never found at the beginning of inscriptions…The sequence sign 102 (‘three short strokes’) followed by sign 192 mainly occurs at the end of inscriptions, and is never followed by the usual ‘end’ sign 342 (‘jar’ grapheme)…"

Messages convey through inscriptions: lists of articles traded

In addition to the field symbol, the texts of the inscriptions are composed of an average of five signs. The longest inscription has 26 signs (found on two identical three-sided tablets: M-494 and M-495 of Parpola corpus).

There are over 25 inscriptions with only pictorial motifs, 40 inscriptions with only one sign (in addition to the field symbol); about 110 inscriptions have only two signs; and nearly 150 inscriptions have only 3 signs. (See also: Sepo Koskenniemi et al., 1973, p. x). A number of inscriptions use from 1 to 12 short strokes, an apparent system of marking 'quantities'.

This is a remarkably cryptic (economical) use of graphemes and an indication that the graphemes (or signs) and (perhaps, also pictorials) may refer to physical objects and numbers.

Among the ashes on a warehouse floor in Lothal were found a hundred clay tags, bearing inscriptions created by seal impressions on one side and of packing materials (bamboo, mattings, woven cloth, cords, reeds) on the other.

It has also been noted by earlier attempts at decipherment that many seals with inscriptions have cord holes, suggesting that the seals might have been worn by their owners.

Dholavira: Sign-board inscription

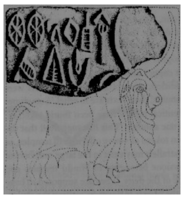
A unique inscription on a long wooden board, with 10 signs, each 33 cm. high and 27 cm wide, made of white faience or white gypsum paste or glazed steatite fixed in grooves. The monolithic sign board was found on the ground lying over debris; when mounted, it was perhaps hanging on the lintel of the north gate doorway. 10 signs inscription found near the western chamber of the northern gate of the citadel high mound (Bisht, 1991: 81, Pl. IX)

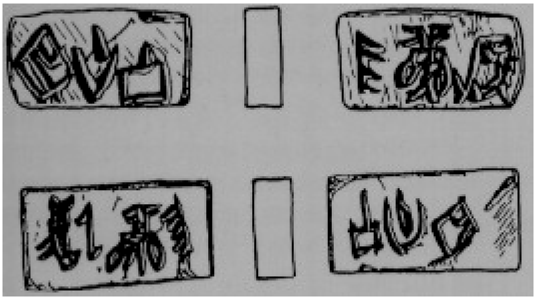


Mounted above the gateway, the signboard would have been visible from most parts of the city. ASI. The industries and craft activity of the city included: agate beadmaking, shellworking, and ceramic production.

The sign board is read from left to right.

Mohenjodaro (Seal M-1384)[After reconstruction based on seal fragment in Parpola, 1994, Fig. 7.8) The spoked circle is duplicated in the inscription on this seal, analogous to the duplication in the Dholavira sign board.





Harappa: incised steatite seals; inscriptions are written in opposite directions, indicating that the direction of writing did not significantly impair the reading of the message. This is a strong ndication that each sign constituted a word and thus, inscription might have represented a list of commodities. (top, H95-2435, bottom, H95-2497; after J.M.Kenoyer, 1998, Fig. 4.10).

However, there are significant indications that wherever an animal motif was used, the animal(s) were depicted to face the direction of writing of the inscriptions. This is indicated by the most frequently occurring end-sign, the ‘jar’ (Sign 342), which is a classifier sign, in many cases, classifying the metallic weapons and tools listed in an inscription.

An alternative interpretation may also be offered that the sign ‘jar’ was intended to orthographically emphasise that it was a jar with a rim, the homonym of which represented the most frequently traded tool or weapon in the civilization—the sword—xanro (Gypsy); khan.d.a (Skt.) The homonymous word for a ‘rim’ was: karn.a or kanka, or kan(ka), meaning, ‘of copper’. Kan.d.a is a pot and khan.d.a (Skt.), xanro (Gypsy) is a sword.

The spoked circle is duplicated in the inscription on a Mohenjodaro seal (M 1384), analogous to the duplication in the Dholavira sign board.

These ten in-laid, large-sized signs on the board are read from left to right. The 'spoked circle' sign seems to be the divider of the three-part message. The decipherment of this sign as a generic word for ‘tool’, karuvi or ‘sword’, khan.d.a may further reinforce the direction of reading of the inscriptions as a set of specific bronze/copper weapons preceding this ‘jar’ sign. There are also exceptions to this general direction of direction with instances of the use of ‘mirror images’ of inscriptions, boustrophedon style and along three sides. For determining the sequence in which the signs should be read in an inscription,

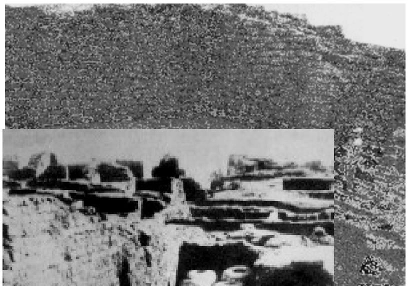
Asko Parpola, who has prepared superb concordances comparable to those of another savant, I. Mahadevan, which are indeed treasures for civilization studies, states: “More dependable external evidence is supplied by the spacing, both in individual signs and in inscriptions. Sometimes the inscription is shorter than the allotted apace. Texts starting from the right edge and leaving an unused space to the left may reasonably be expected to run from right to left. The direction right to left is beyond any doubt in the case of the square seal H-103 in which a long inscription runs anticlockwise along two whole sides and part of a third, whiel the rest of the third and part of the fourth side are left blank. At each corner the signs are turned through 90^0 so that their tops are always towards the edge. Only the first side is filled by the inscription from edge to edge, and must therefore be the one with which the engraver started his work.” (Parpola, 1994, pp. 64-65).



Harappa; seal H-103 inscription runs on three sides, each side read from right to left.

Context of the sign-board find at Dholavira (Kotada)

Dholavira, Khadir island, Dist. Kutch. Rann of Kutch.





Dholavira East gate. Chamber with pillar bases of different types of smoothly carved ringstones. . (Plate IVc and Va, S.P. Gupta, 1996, *The Indus-Sarasvati Civilization*, Delhi, Pratibha Prakashan).

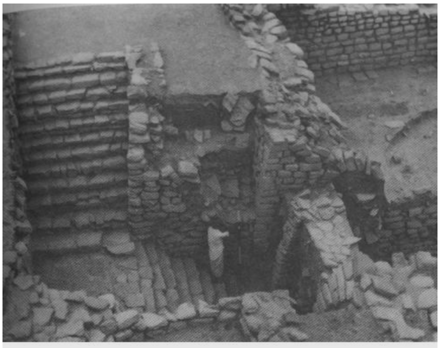




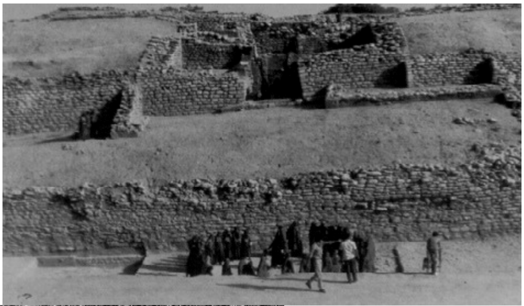
Dholavira: Ringstones used as bases for wooden columns; located in the side

walkways in the gateways of the citadel. ASI.

Ringstones made of white limestone piled along a street in HR area of Mohenjodaro.; considering that similar ringstones have been found at Dholavira in situ as fbases for large wooden pillars , it is possible to envision a similar structural use in Mohenjodaro and other cities of the civilization. ASI.

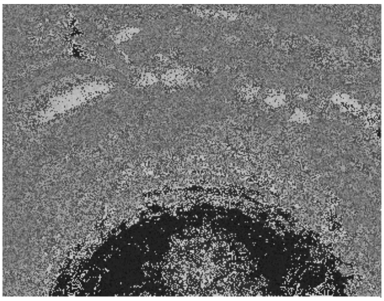


Dholavira. East gateway. Seen in the foreground is a remarkable polished pillar capped by a mushroom-shaped top. (Plate IVd, S.P. Gupta, 1996, *The Indus-Sarasvati Civilization*, Delhi, Pratibha Prakashan).



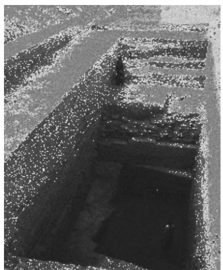
Dholavira: staircase, northern gateway of castle

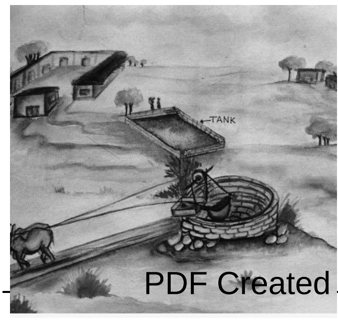
Dholavira: citadel and northern gateway overlooking an arena or plaza; ASI.





Dholavira: well in the citadel





Dholavira: reservoir, diverting the water from nullah, drawing water from well



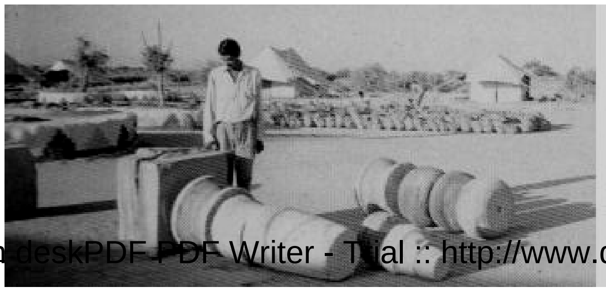
[The diagrams are based on: B.B.Lal, *Earliest Civilization of South Asia*, 1997].

Dholavira (Kotda). On one of the islands of the Rann of Kacch. **Fortified settlement, with fortifications separately for the Middle Town and the citadel**. The citadel commanded the entire scenario with a height of 15 to 18 m. above the surrounding ground level. Seasonal nullahs (Mansar and Manhar) flow past the northern and southern sides of the fortified area. The nullahs were bunded to supply water to the tanks and wells. **Armoury!**

A well has been discovered south of the 13m. wide street in the citadel.A horizontal slab of the trough had markings showing the passage of the rope used to draw water from the wall. Water drawn from the well was conducted through a covered channel to feed a nearby tank (4.35 m X 2.95 m.) with a depthof 3.58 m. Side walls of the tank were formed by vertically placed stone slabs; the upper part had stone-rubble masonry. The floor was paved with stone slabs. Sketch 1 illustrates the damming of the Manhar nullah to divert the water to the reservoir. Sketch 2 illustrates a pair of bullocks drawing water from the well.

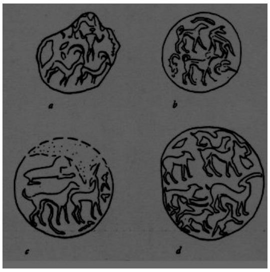
The citadel had two gateways: one on the northern and the other on the eastern side. Each gateway had an elaborate staircase. The landing of the staircase was at a depth of 2.3 m. After ten steps and a further descent of 2 m., the staircase led to a passage way which was 7 m. long On either side of the passage, there was a chamber which had a roof resting on stone pillars. In one of the chambers, a unique inscription was discovered. The ten letters of the inscription had a height of about 35 to 37 cm. and a width of 25 to 27 cm. The letters wee made of sliced pieces of some 'crystalline material, maybe rock, mineral or paste'. Perhaps mounted on a wooden board, the inscription might have constituted a sign-board. Ring-stones were used to support the pillars.
The eastern gateway also had a staircase and passage way with a chamber on either side. Many well-polished stone pillars were found in situ. Similar polished pillars were later found as belonging to the As'okan times, the third century BC.

Dholavira: stone pillars



Sources of Lapis Lazuli: Badakhshan

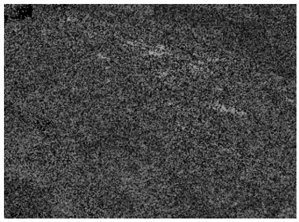
In Mesopotamian and Sarasvati-Sindhu valley sites, significant numbers of objects of lapis lazuli have been found. In the 'royal' tombs,lapis lazuli, and gold are the three important materials used. Lapis lazuli is rare stone found in Badakhshan mines(NE Afghanistan, known as Kerano-Munjan), in the Pamirs and near Lake Baikal in eastern Siberia (F. Rutley rev. by H.H. Read 1948), pp. 380-381).



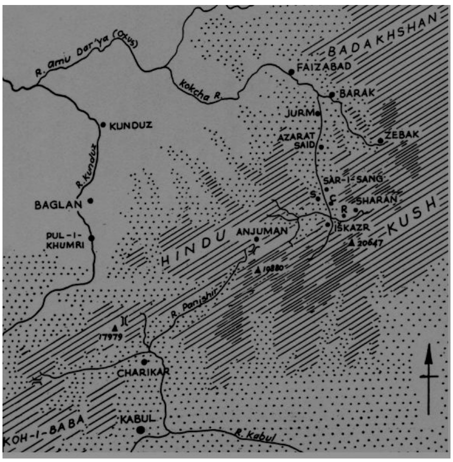
Lapis Lazuli seals
W14772 cl



Kalibangan. Modern field ploughed with a cattle-drawn plough in a continuous U-shape.

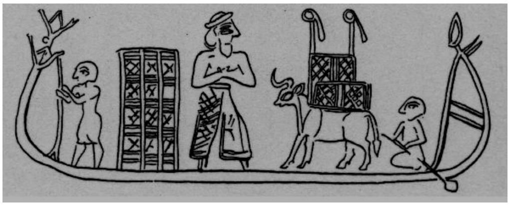


Kalibangan: furrowmarks of a pre-harappan agricultural field; the pattern of ploughing has survived; ploughed field with criss-cross furrows, pre-Harappan; a pattern which is followed even today in the region (After B.B. Lal, 1984, Pl.. 27).

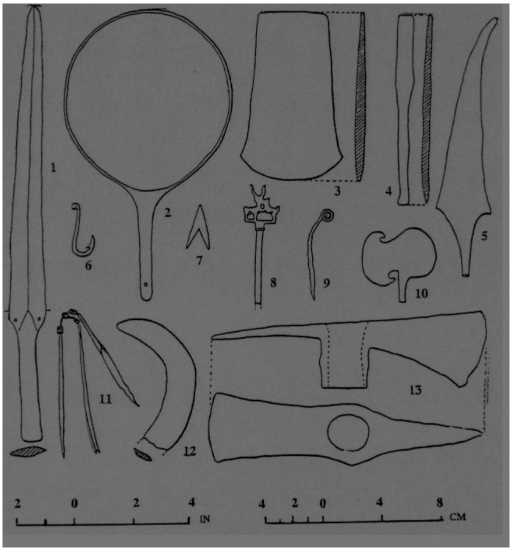


"Darius states that his lapis lazulicame from his satrapy of Sogdia, in which province Badakhshan located; and finally, the colour range from Sar-i-Sang is comparable to that of archaeological lapis lazuli. varying shades of the pieces of veneer on the 'Standard' of Ur, instance, can be exactly paralleled by modern specimens from Badakhshan...

The lapis lazuli seal W. 14772 cl relates to the Uruk IV period. The unstratified



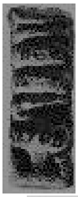
lapis lazuli seal G.7-205 (Fig. 4b) has the figures of two salukis and a 'fox'... This is comparable to the impression of another seal found at that (Fig. 4a)... Also comparable are the seal impressions shown in Fig. and 4d. Fig. 4c has two superimposed dogs on the left and the hunted animal with turned head in front of them. [Turned-head is a motif used in Indus Inscriptions while depicting a tiger or an antelope.] Fig. 4d, if divided horizontally also shows a similar scene... Porada has noted that filling motifs of 'disembodied heads of horned animals are another feature of period'.[A.J.Tobler, *Excavations at Tepe Gawra, II,* Levels IX-XX, 1950, p. 192; Georgina, Herrmann, Lapis Lazuli: the early phases of its trade, in *Iraq 30,* 1968, pp.21-54]



NE Afghanistan, 4 lapis-lazuli mines are at heights ranging from 6000 to 17000 ft.: Sar-i-sang, S (Stromby), C (Chilmak) and R (Robat-i-Paskaran); Sar-i-sang mine is worked even today. [After Georgina, Herrmann, Lapis Lazuli: the early phases of its trade, in *Iraq* 30, 1968].

Harappan civilization: copper/bronze tools, flat axes with splayed out sharp edge, straight-ended chisels, sickles, knives with a curved end, straight and curved saws, planer-bits, drills, awls, arrowheads, spearheads, curved fish-hooks with a loop at one end and a sharp conical projection at the other, curved-in razors, circular mirrors with a tang perhaps inserted into an ivory handle, hairpins with single-or double-spiral heads needles (some with the eye near the pointed end), nails, chains. Late Harappan level of Chanhudaro yielded an axe with a shaft hole (two models of this type in clay are seen in Mohenjodaro); one example of

an axe combined with an adze with a shaft hole has been found in a late level in Mohenjodaro.

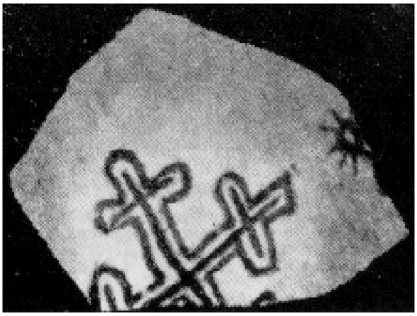


M-457 (One side of the tablet); appears to be a structural support like a pillar erected on a wooden pole reinforced by ring-stones. This pictograph is reminiscent of the ring-stones found in situ at Dholavira as structural supports.

The other side has a pictorial motif of a cross and two signs.



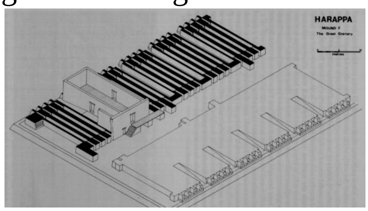
Mohenjodaro: four crosses are joined into a larger cross; one of the two signs resembles the large, organized area in Harappoa called a 'granary' (M-457, inscribed tablet; Calcutta, Indian Museum). What is called a 'granary' may perhaps have been a staging area for storing the raw materials required by lapidaries and smiths and the finished bronze-age products dispatched by river and sea to far-off markets for exchange.

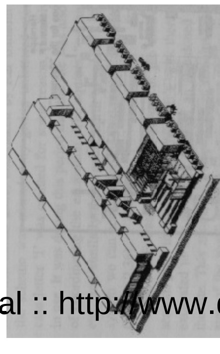


Navdatoli: painted potsherd of Malwa Ware, ca. 1700-1400 BC (After Sankalia et al., 1971: 216 f., fig. 87: D 585 (sherd 8355 Ia 13/5). Parpola notes the parallel of this Navdatoli motif with the sign depicted on the Mohenjodaro tablet (Parpola, 1994, p. 55).



Harappa: Vats, M.S. identified this area as a granary, located on Mound F; built on a massive mud-brick foundation; 50 X 40 m. with two rows of six rooms arranged along a central passageway about 7 m. wide, partly paved with baked bricks. Each room is 15.2 X 16 m. No grain or storage containers were found here.





Nearby were the rows of circular platform. It is suggested that this building was the **smithy or**

workshops of smiths for cold hammering of copper/bronze plates into shape and the circular platforms were the shops on the market street to sell the metal wares produced in the smithy. (Picture after J.M. Kenoyer, 1998, fig. 3.26).

Sign 244 (and variants) used in the script of the civilization is reminiscent of this building.
Granary (?) at Harappa, a reconstruction; earlier referred to as 'the area of the parallel walls" is presumed to be a storage area. (The photograph of the 'area of the parallel walls' from trench A(6) from the southeast, at Harappa; ASI, Punjab Photographic Volume 463/86).

Harappa, granary? Harappa brick wall? Warehouse. An isometric view (After Vats). Between the citadel mound and the old river bank is a series of brick platforms for two rows of six warehouses, each 16m by 6 m (with a combined floor space of about 800 sq. m. To the south of this granary was an area of working floors with rows of circular brick platforms perhaps for threshing grain (wheat and barley chaff were found in the crevices of the floors).

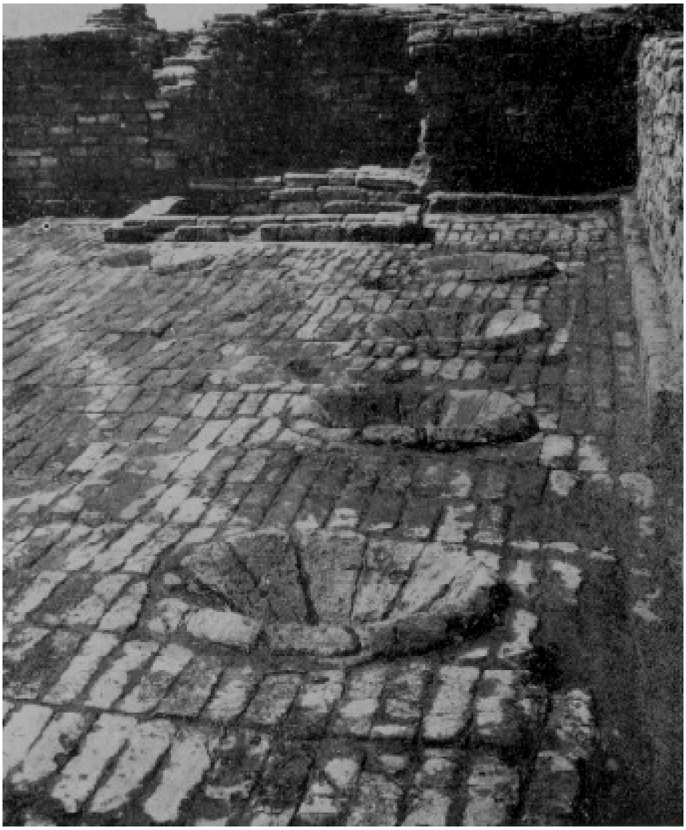




Pointed base terracotta jars with seal impressions (on the shoulder), wheel thrown off the hump and string cut base , Mohenjodaro Cat. Nos. 193, 194; Mohenjodaro Museum, MM 1481.52.2633, MM 1509; Dimensions, respectively: 15.2cm. height; 12.3 cm. Maximum dia; 14.7 cm. Height, 12.3 cm. Maximum dia. (After J.M. Kenoyer,

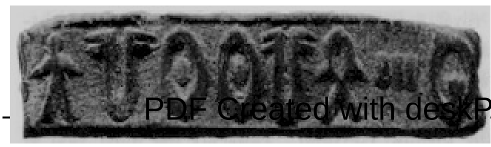
1998, *Ancient Cities of the Indus Valley Civilization*, Karachi, Oxford University Press; Cat. Nos. from the Exhibition held in USA in 1998).

Mohenjodaro: floorings using wedge-shaped bricks; might have been used to hold the pointed base jars containing bronze or copper weapons, tools or bangles. The floor organization may constitute an earliest shopping-mall with wares displayed. (After Heras, H., 1953, *Studies in Proto-Indo-Mediterranean Culture*, Bombay, Indian Historical Research Institute, Fig. 59).



The seal impression on the jar with a pointed-bottom contains the following sequence of signs:

Considering that the bronze tools were discovered kept in storage jars (See Vats, 1940, Harappa: Pl. CXXI Copper Jar No. 277 and its contents of bronze/copper weapons), it can be hypothesized that the jars were used as



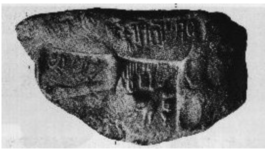
storage vessels which were displayed for sale; the inscriptions should have connoted the contents of the jars, which were most likely bronze or copper weapons and tools. The pointed base could have been embedded within the center of wedged platforms – shopping malls – to sell the artifacts made by the armourers. The exact description of the items put out for sale using these storage jars will be discussed further in the context of the process elaborated elsewhere to identify the keys to decipher the inscriptions on such seals and sealings or seal impressions.

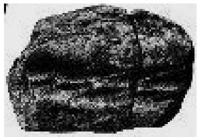
Terracotta moulded tablet containing inscription from Mohenjodaro (M-1429). After Dales 1968: 39. Two other sides of this prism tablet show a fish-eating alligator and a ship. The inscription contains the same sequence of three signs as on the stamped inscription on the pointed base pottery, hypothesized to contain bronze or copper weapons and tools for sale. This moulded talet may have been used to transport the goods for sale across the rivers, the high seas and the Persian gulf towards Mesopotamian civilization areas.

Trade contacts; images connote substantives (e.g. weapons and tools)

The Maha_bha_rata notes the use of seals by warriors to gain access to the armoury and/or the army unit. During the historical period, seals were used to authenticate sealed packages containing merchandise, as described by Kaut.ilya in *Arthas'a_stra*; Kaut.ilya was a minister in the court of Candragupta Maurya (ca. 2400 BP): "2.21.1. The Collector of customs and tolls should establish the customs house and the flag facing the east or the north in the vicinity of the big gates (of the city). 2. The receivers of duty, four or five in number, should record in writing (details about) traders who have arrived in a caravan, who they are, from what place, with how much merchandise and where the identiy-pass (was issued) or the stamping was made. 3. For (goods) without the stamp the penalty is double the dues. 4. For those with a forged stamp, the fine is eight times the duty. 5. For those with broken stamps, the penalty is distraint in the warehouse...16. And for goods that have passed beyond the foot of the flag without the duty being paid, the fine is eight times the duty. Secret agents operating on roads and in places without roads should find out such (evasion)." [Kangle, R.P., (ed. and trans.) 1972, *The Kaut.ili_ya Arthas'a_stra, I-III*, Bombay: II, 141-3).

An example of a smoothed back on a clay sealing to authenticate the merchandise is found in Kalibangan. Seven seal impressions were discovered in Kalibangan each impressed, partially, by a single seal with the 'one-horned bull motif' and identical inscriptions; the findspot was the southern part of the acropolis where the so-called fire altars were also discovered (explained elsewhere as related to metalsmiths' workplaces):

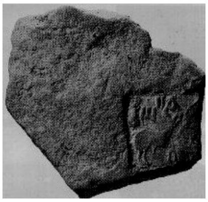




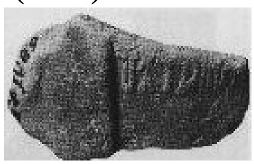
Kalibangan; Seal impression (K-89)
Kalibangan; Seal impression (K-88); obverse of the clay tag shows the impression of cord used to tie-up the package

Kalibangan; Seal impression (K-87).

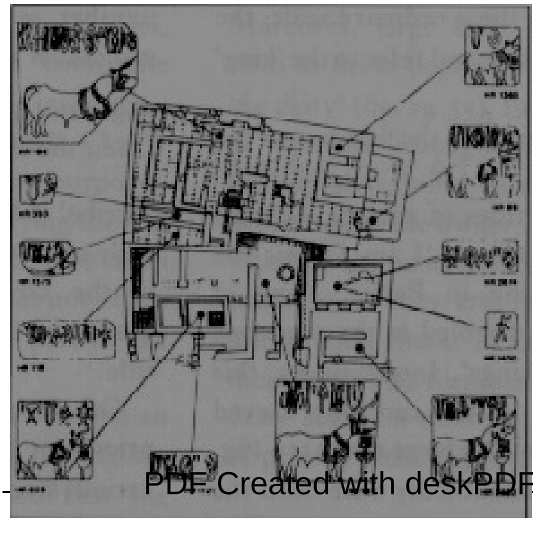
Kalibangan; Seal impression (K-86)

Kalibangan: Seal impression (K-83)
Kalibangan: Seal impression (K-82)
Kalibangan: Seal impression (K-81)



Same inscription links with different animal motifs in many inscriptions indicating that the animal motifs and the messages conveyed through the inscriptions are closely interlinked; perhaps, the messages were lists of merchandise of bronze age weapons and tools; the animal motif designated the principal merchandise item, the raw material used or the profession or trade of the holder of the inscribed object.



Mohenjodaro: findspots of seals and tablets



containing inscriptions in house I, HR-A area. A significant number of seals were found in this house. This was perhaps a workshop of a group of smiths. (After Jansen, Michael, 1986, *Die Indus-Zivilisation: Wiederentdeckung einer fruhen Hochkultur*, Cologne, 200f., fig. 125).

Tablets have invariably been found in habitation debris, indicating that they were ordinarily related to the Harappan daily life. Another important evidence to note is that the tablets occur in almost all settlements irrespective of the distances involved.

Weights have been found together with seals (Vats, M.S., 1940, II, pl. 22a). This locus is comparable with the finds in the island of Bahrain, where gulf seals and weights of the Harappan type were found in the houses close to the city gate, which had a well nearby to serve as a halting place for pack animals. (After Bibby, Geoffrey,1972, *Looking for Dilmun*, Harmondsworth: 368).

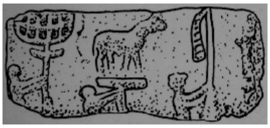
Contacts with neighbouring bronze-age civilizations

Ishtar gate: from the Babylon of Nebuchadnezzar Dr. Koldewey recovered the magnificent Ishtar Gate. It has been restored and erected in the Berlin Museum. Note the depiction of the one-horned bull.

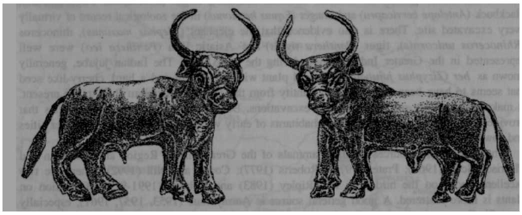


Mohenjodaro; bull figurine without a hump (After Ardeleanu-Jansen, A. Franke U., and Jansen, M., 1983, An approach toward the replacement of artifacts into the architectural context of the Great Bath at Mohenjodaro. In: G. Urban and M. Jansen, eds., *Forschungsprojekt DFG Mohenjodaro*. Aachen: reinische-Westfalischen Technischen Hockschule: 43-69). This is clearly the model of the bull without a hump used to depict the

one-horned bull on the seals with inscriptions.

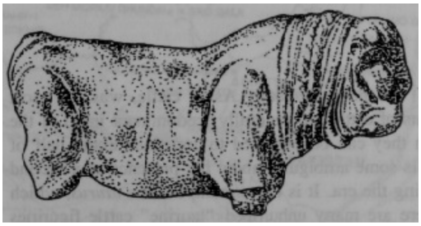


Sketch of the pictorial motifs on one side of the tablet in bas-relief, Mohenjodaro m490: insignia carried in procession: standard, unicorn, ?pennant +? (After Marshall, 1931, Pl. CXVIII.9; and J.M. Kenoyer, 1998, Fig. 5.6).

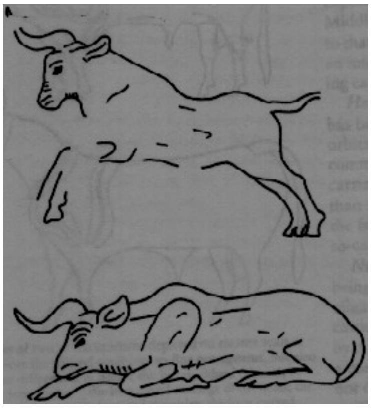


The following models of figurines seem to provide a basis for the depiction of the one-horned bull on the seals of the civilization with inscriptions.

Quetta Treasury; two bos Taurus gold figurines (After Jarrige, J.F. and Hassan, M.U.,1989, Funerary complexes in Baluchistan at the end of the third millennium in the light of recent discoveries at Mehrgarh and Quetta. In, K. Frifelt and P. Sorensen, eds., *South Asian Archaeology 1985,* Scandinavian Institute of Asian Studies, Occasional Papers No. 4: 150—66.: Fig. 8)



Mohenjodaro; steatite figurine of a Bos Taurus (After Marshall, 1931: Pl. XCVII, No. 23).



Sketch of two Middle Eastern Bulls (Bos primigenius). From a relief of a hunting scene at King Ashurnasipal’s palace at Nimrud; “...the wild ox or urus of Europe, North Africa and the Middle East was *Bos primigenius primigenius,* closely related and similar to *B.p. namadicus,* except for having relatively short horns and being larger; this is the ancestor of all the non-humped cattle (*Bos Taurus*) found today in temperate regions in most of the rest of the world...Is it then a composite



animal? This is undoubtedly a possibility: some parts resemble cattle (sometimes humped cattle), others look like antelopes, hartebeests or nilgai...'perhaps we have here a fabulous animal which is a composite of the ox and the antelope'...Some of the unicorn's features may have been over-emphasised to suggest a contrast with those of the familiar humped bulls."(After Grigson, Caroline, 1984, Some thoughts on unicorns and other cattle depicted at Mohenjodaro and Harappa, in: Allchin, Bridget, ed., *South Asian Archaeology 1981*, Cambridge, Cambridge University Press, Fig. 21.1, p. 166)

Sumer, cylinder seal depicting a row of one-horned bulls and ears of corn (H. Frankfort, *Cylinder Seals*, London, 1939, pl. Vb). "...the 'unicorn' appears to be a watered-down, much recopied version of the Sumerian and Proto-Elamite one-horned bovine tradition." (During Caspers, Harappan Temples-- fact of fallacy? *South Asian Archaeology 1987*, p. 248). During Caspers also sees parallel between the ear of corn shown on cylinder seals and the 'standard' shown on the Harappan inscriptions in front of the 'unicorn'.



Bull-god and goddess, Susa, 2nd millennium B.C. (Paris) [Note the high quiver holding 5 spears indicating a hieroglyphic semantic link between the bull icon and weapons]. There are ligatured pictorials on the seals and tablets of the Sarasvati Sindhu civilization depicting a horned person with hoofs and tail.



m451b Eagle in flight

The ligature on the Nal pot ca 2800 BC (Baluchisan: first settlement in southeastern Baluchistan was in the 4th millennium BC) is extraordinary: an eagle's head is ligatured to the body of a tiger. In BMAC area, the 'eagle' is a



recurrent motif on seals.Ute Franke-Vogt: "Different pottery styles link this area also to central and northern Balochistan, and after about 2900/2800 BC to southern Sindh where, at this time, the Indus Civilization took shape. The Nal pottery with its particular geometric and figurative patterns painted in blue, yellow, red and turquoise after firing is among the earliest and most dominanstyles in the south."

The principal weapon: sword

The sword is a principal weapon, because, the 'one-horned bull' is the dominant motif in the inscriptions of the civilization.

va.l. sword, saw (Ko.); karava_la sword (Skt.); ba.l.i katti the long sword of the Coorg warrior (Kod.); po.l. sword (To.); ba_l.(u) knife, sword (Ka.); razor, small kinife attached to cock's spur when fighting (Tu.); va_lu sword (Te.); va_l. sword, saw, ploughshare, scissors, sharpness (Ta.); sword, saw (Ma.)(DEDR 5376).

vahola_ (mattock or adze), khan.d.a (sword), kus' (ploughshare), pol.a (gimlet and lathe-drill)

corresponding to the pictorial motifs: young bull (vahar.), pannier (kan.t.a_l.a), one horn (kus') and the standard device (pol.a).

[Bow-lathe-drill. An available guide is a broken fragment of a stone relief of the second century AD from a gem-cutter's tomb in Lydia in Turkey showing a bow-lathe; the depiction of the cutting edge is lost (cf. Charleston 1964: 85, fig. 2: the drawing is a reconstruction. Rehman Dheri, where carbon-14 dates of 4400 and 4520 BC are given for the earliest levels, is said to possess 'the richest bead industry of the contemporary sites on the subcontinent. The few round furnaces, lumps of lapis, cornelian, agate, and turquiose, and the availability of unfinished beads with stone drills intact would suggest that bead manufacturing was carried out at the site...The rich contemporary lithic industry of flint, jasper, chalcedony, and agate included microdrill heads. A cornelian bead with a drill still in the half-finished perforation confirmed their use (Durrani 1981: 204, pl. III), as at Hissar and Shar-i-Sokhta in eastern Iran and as at Chanhudaro and Lothal].

Together with the one horn, ko.r. horns (Ko.); ko_t.u horn (Ta.Tu.)(DEDR 2200), the pictograph may connote, kot.u va_l. = crooked, bent sword. Cf. god.ali axe (Ote.); kod.ari (Tu.); kod.ali (Ka.); kut.ha_ra (Oskt.)(CDIAL 3244; DEDR App. 32).

The pictograph: young bull

va_hr.ka_ male heifer; vehir. Heifer; va_har., vohur., ve_har. young bull (L.); vahar., vahir.a_, bahir.a_ young bull (P.); bahar. Young bullock (Ku.); vahur.o young bullock (S.); vahad.a calf to be trained (Pkt.); vaha shoulder of an ox (Pkt.); ba id. (A.); bahar young bullock (N.)(CDIAL 11459).

Other homonyms:

vhel, vel bullock-cart (G.); bahal, baheli_ two-wheeled cart (Bi.); bahal id. (H.); bahaila cart (OMarw.)(CDIAL 11458). [Note the spoked-wheel (of a cart or ratha) depicted on the neck of a one-horned bull, almost like a phonetic determinant].

FS-03 (Mahadevan) M-712 (Parpola)

vahel.o, vohel.o, vel.o small stream (G.); vaha_l., ohal. ohal.i_ streamlet, oozing (M .); bak channel conveying water into field (Mth.); ba_ha_ arm of river or canal (P.)(CDIAL 11452).

vehr.a_ = octopus (Jat.ki. lex.) [Note the head of a one-horned bull ligatured to an octopus on a seal and on a copper blade weapon].

bahula_ pl. the Pleiades (VarBr.S.); bahul id. (Kal.); bol, boul, bolh (Kho.); bale (Sh.)(CDIAL 9195).

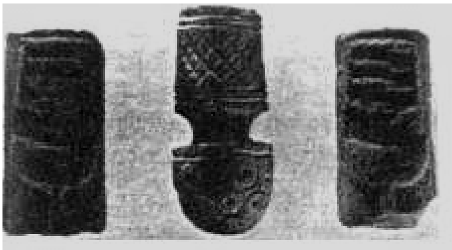


Standard in front of the bull (ibex, urus) with one curved horn

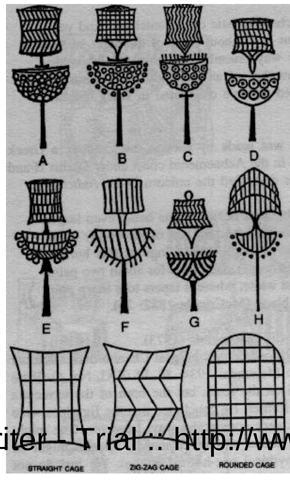


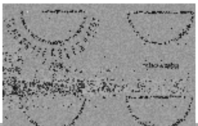
m-1656 Pectoral, Mohenjodaro; This pectoral shows a one-horned animal (bull/ibex/urus) and a device (standard) placed in front of the animal. This pectoral has just one inscription with one pictogram on the upper register: 'an overflowing vessel'. ‘one-horned bull’ motif; bull (ibex, urus) with one curved horn, vase from which two streams of water flow. The pectoral has a kidney- or womb-shaped symbol on its belly (some faience bangles have similar shape); leaf-shaped motifs (like the papal) are depicted on the shoulder (?pannier) and the rump; the standard device is placed in front of the animal, the one-horned bull; the deeply incised areas would have been set with inlay. (Unfired tan steatite; 6.3 X 6.89 cm.; Karachi National Museum 50.125; DK 8063; Mackay, 1938: 546, pl. CXL.59). This pectoral exemplifies the basic method of depiction of messages on seals or tablets: a pictorial motif is generally combined with a sign or cluster of about five signs.

m-018 Seal

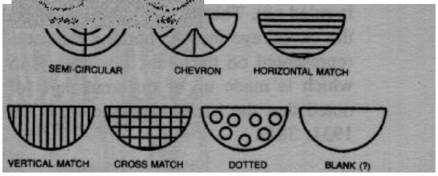


Carved Ivory Standard in the middle [From Richard H. Meadow and Jonathan Mark Kenoyer, Harappa Excavations 1993: the city wall and inscribed materials, in: ***South Asian Archaeology*** ; Fig. 40.11, p. 467. Harappa 1990 and 1993: representations of 'standard'; 40.11a: H90-1687/3103-1: faience token; 40.11bH93-2092/5029-1: carved ivory standard fragment (split in half, made on a lathe and was probably cylindrical in shape; note the incisions with a circle motif while a broken spot on the lower portion indicates where the stand shaft would have been (found in the area of the 'Mughal Sarai' located to the south of Mound E across the Old Lahore-Multan Road); 40.11c H93-2051/3808-2:faience token]

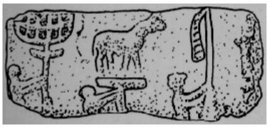




Styles of the bowl (or bottom portion of the standard); cf. Rissman 1989: 162

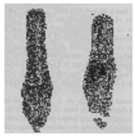


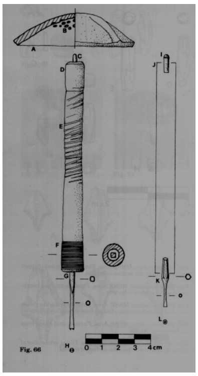
Styles of depiction of 'flow' or, ‘churning motion’ (of a lathe) and lip treatment on the bowl (or bottom portion of the standard); cf. Rissman 1989: 162

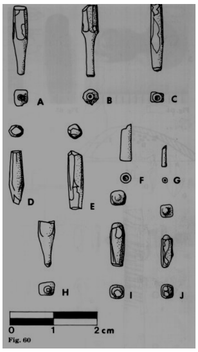


Sketch of the pictorial motifs on one side of the tablet in bas-relief, Mohenjodaro m490: insignia carried in procession: standard, unicorn, ?pennant +? (After Marshall, 1931, Pl. CXVIII.9; and J.M. Kenoyer, 1998, Fig. 5.6).

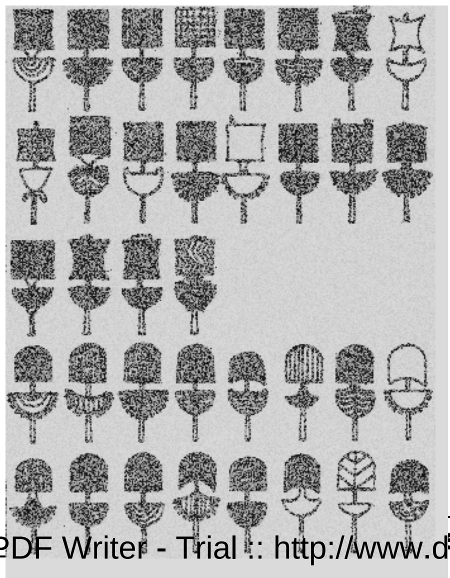
Styles and structure of the standard and the top portion (cage?); cf. Mahadevan 1984: 185; Rissman 1989: 162 The top portion resembles a drill-lathe and a drill-head (gimlet). The wavy lines inscribed are a stylised depiction of 'turning motion' of the lathe. The style depicted as G is related to the practice of inserting the upper pivot of the drill-head into a coconut-shell; see below.







Phtanite drill-heads from the surface of MNSE area, Moenjodaro (Massimo Vidale, 1987, p. 147)



Reconstruction of a drill based on analogical comparisons with the drills used nowadays at Nagara, Gujarat, India: Upper pivot in copper is centered with the drill-head and inserted into a coconut shell. Wooden haft is used with a bow-string to churn. The phtanite drill-head is secured in the haft-hole with a thin coiling thread. The tip of the drill's

working end shows the characteristic feature of the shallow hemispherical depression: a 'dotted circle'. (After Massimo Vidale, 1987, p. 148).



Macro-photo of two very used drill-heads, showing the little depression at the tip of the working end; closeup of the distal ends of four drill-heads showing depth and shape of depression. cf. Piperno, Marcello, 1973. Piperno, Marcello, Micro-drilling at Shahr-i Sokhta; the making and use of the lithic drill-heads, in: Hammond, Norman Ed., *South Asian Archaeology*, 1973, Pl. 9.2 and 9.3 "granite drill heads used to perforate beads, prepare stone seals... use of the "bow drill" or the "pump drill" which revolved the point of the drill in an alternating rotary motion...the level of technical performance reached in this micro-drilling work was peculiar to a class of highly-specialized craftsmen who must have enjoyed a considerable social and economic position in the life of Shahr-i Sokhta." (p.128) [ca. 2700-2300 B.C.]

Various representations of the Harappan 'standard' shown generally in front of the one-horned bull on inscriptions (Drawing by G. de Vries, cited in During Caspers, ***South Asian Archaeology***, 1987, p. 250).

The battle (weapon)

S[illegible] battle (RV)(CDIAL 13082). Sagho strong (S.)(C[illegible]3081). Sam.gh[illegible]a destruction (Pkt.); sa~ha~rn.e~ to d[illegible]M.)(CDIAL 13064). Xa[illegible] destruction (A.); sa_n:g finis[illegible] (CDIAL 13327). Sa_y destructio[illegible]); sa_ya id. (Or.)(CD[illegible]).

The pictograph

Sa~gha_r.o lathe (G.); s[illegible]rt of a turner's apparatus (M.); sam.gha_t.a fitting [illegible]g [illegible] timber (R.); sa~_gad.i_ lathe (Tu.)(CDIAL 12[illegible]

Other h[illegible]s

[illegible] body of pilgrims; sa~_go caravan (S.); san:g ([illegible])(CDIAL [illegible]34). Sa~_go caravan (S.)(CDIAL 13328).

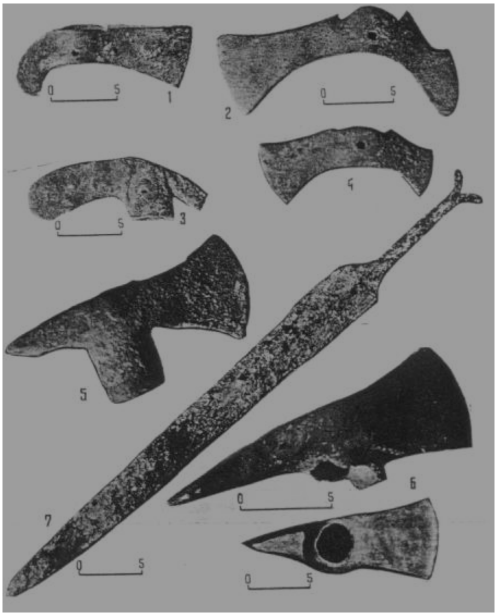
San:ga a beam laid breadthwise4 supporting the roof of ... (...tali.lex.)

Sa~gad. A ... formed of two or more f... ...mals or men etc. linked together (M.)(...DIAL 1285...) ... together with the limbs (S'Br.AV.)(CDIAL 1332...

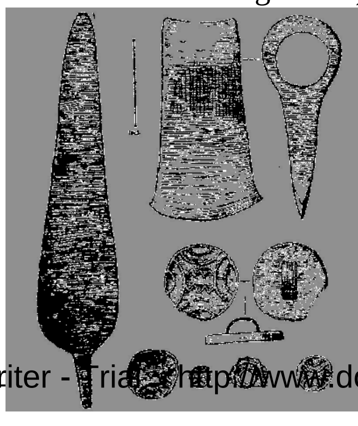
Thus, together ... horned bull a... ...he lathe 'device' (which, together ... 139 inscriptions of Mahad... concordance + the p... ...36) may be read as:

ko.r. va.l., axe + **sa~gad.**, battle, i.e. battle-axe

If contacts have to be found to establish the interaction networks and boundaries of the impact of the civilization which flourished on the banks of the Rivers Sarasvati and Sindhu, the region to be investigated is Mesopotamia and not Bactria Magdiana Archaeological Complex (BMAC). We will establish that the following quote is partly untenable, in regard to the contacts of Indian civilization with her West Asian neighbours.



Bactria; axes [(i)utilitarian: figs. 4.5,6; with analogies in the Indus valley, southern regions of central Asia and in late bronze age Iran). Unique are the spur-head axes in Bactria (fig. 4.1-4); (ii) cultic: so-called because of their characteristic heads, cast in the form of a 'cock tail' which have parallels in Luristan axes (Schaeffer 1948: fig. 265.8)] Fig.



4.2 is perhaps the head of a mace, cast as a massive cylinder with spikes and thickenings at ends resembling similar spiked Luristan heads (Amiet 1976: nos. 5,6).

The Luristan heads shown in nos. 5,6 are indicators to the key to decode a sign used in the script: ^ (an inverted V, like the lid off a jar; this sign also occurs on the Dholavira monolithic sign-board). This may connote spiked-edged of a weapon. In this illustration, the axe combines with a spiked-edge, like an adze. When the sign is ligatured with a 'rimmed jar', the message may be read as 'spiked-edged weapon (adze) and a sword'.

Shahi-tump Jhukar collection: seals, axe, and spearheads. [Among the finds from Jhukar sites like Periano Ghundai, Mughal Ghundai, Rana Ghundai, Lohumjo-daro, Amri III-4, Jai Damb and Shahi-tump cemetery are only a few items. The graves, however, contained complete bodies with legs flexed and included groups of pots, copper or bronze tools and ornaments. The implements included copper spear and shaft-hole battle-axe. Copper spear without mid-rib was found. Piggott notes that the axe may 'derive from Sumerian and Akkadian prototypes." (Stuart Piggott, *Prehistoric India*, Harmondsworth, Penguin Books, 1951, p. 219). These graves also contained five copper stamp seals which are circular and built up in compartments. Similar seals found in Hissar Iib (Early Dynastic II = 2600 B.C.) and IIIb (2200-2000 B.C.) in Anau III and at Susa are dated to about 2000 B.C. (Stuart Piggott, ibid, p. 220). The socketed axe has a parallel in finds in Hissar IIIc. (E.F. Schmidt, Excavations at Tepe Hissar Damaghan, Philadelhpia, Univ. of Pennsylvania Press, 1937, pl. LII, p. 204).



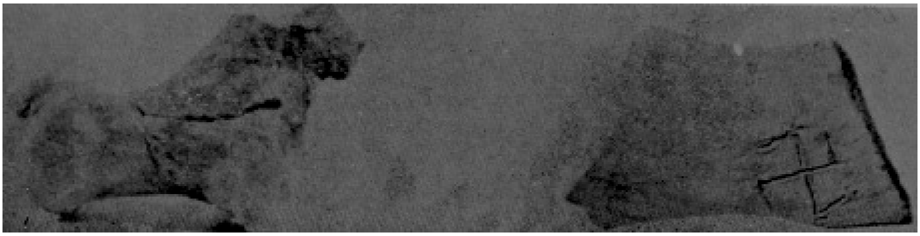
Jhukar assemblage: 3 seals

"It transpired that in the 2nd millennium BC there existed in the territory of ancient Bactria a highly-developed, largely original culture of the ancient-oriental type. A close,

or rather identical culture spread at that time through the southern regions of central Asia, particularly in Margiana, which gave grounds for singling out a special Bactrian-Margian Archaeological Complex (BMAC). The basic features of this complex are: the coexistence of non-fortified settlements and of rectangular fortresses with round corner turrets. The latter belonged to individual families or clans... Occurring in sufficient quantities, long with stone and flint tools and wapons, are copper and bronze ones. These are sickles, knives, adzes, awls, razors, daggers, massive spearheads, battle axes; of the ornaments there are mirrors, toilet pins, cosmetic falcons, bracelets, ear-rings, rings... At present we may regard as an established fact the existence of an Iranian-Turkmenian metallurgical province where, beginning from the turn of the 5th and 4th millennia BC, uni-typical wares take shape and exist for a long time. There is every ground to assume the dissemination from it of metal-works (celts, daggers, pins) and specific forms of earthenware (stemmed vases, saucers, etc.) in the eastern direction down to the vally of the Indus, by way of exchange, trade and cultural contacts. This period embraces the existence of the Harappan civilization and does not presuppose the arrival of any new tribes. This is strikingly proved by the Harappa culture itself, which demonstrates a continuous line of development without any invasions from outside... We shall merely remark that southwestern Iran and possibly Caucasus emerge as a zone where numerous metal articles come to be produced (mid- 2nd millennium BC), while Iranian Khorassan is doubtlessly the main venue for their penetration into the souther areas of central Asia, Bactria and possibly the valley of the Indus river."(Viktor I. Sarianidi, 1979, New Finds in Bactria and Indo-Iranian Connections, pp. 643-659, in: *South Asian Archaeology 1977*, Naples).

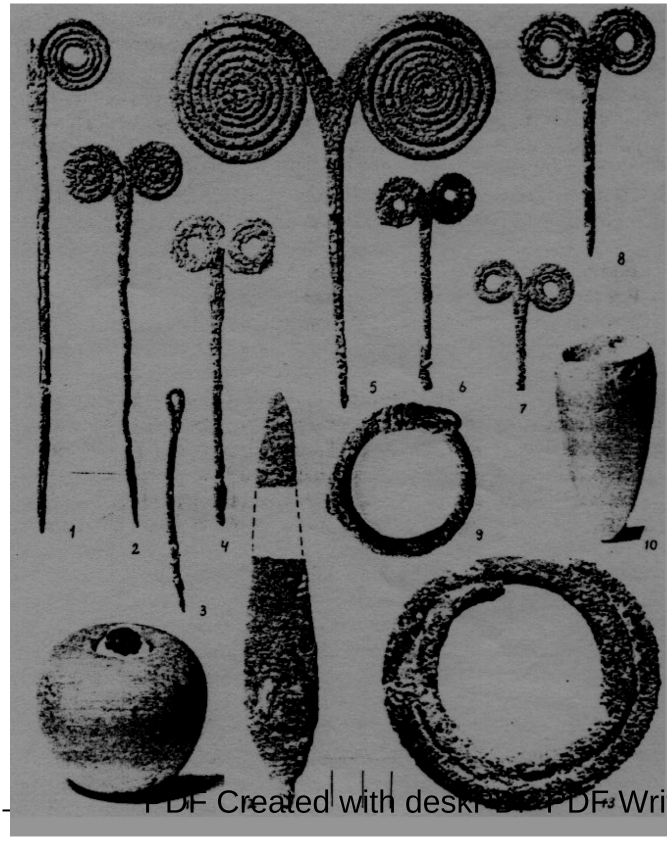
It is interesting to note similar thoughts related to the civilization in the Sindhu Sarasvati River valleys: “Contrary to the common notion that Indo-Aryan speaking peoples invaded the subcontinent and obliterated the culture of the Indus people, we now believe that there was no outright invasion; the decline of the Indus cities was the result of many complex factors. Overextended economic and political networks, the drying up of major rivers as well as the rise of new religious communities all contributed in some way to the creation of a new social order...Even today, in the modern cities and villages of Pakistan and India, we see the legacy of the Indus cities reflected in traditional arts and crafts, as well as in the layout of houses and settlements. These remnants of the past do not represent a stagnation of culture but rather highlight the optimal

choices made by the Indus people.” (Kenoyer, J.M., 1998, *Ancient Cities of the Indus Valley Civilization*, Karachi, Oxford University Press, p. 19).



Central Asia: Altyn-depe and Parkhai
Altin Depe; bull figurine; svastika on a potsherd (After Asthana, Shashi, 1976, *History and Archaeology of India’s contacts with other countries*, Delhi, B.R. Publishing Corpn., Pl. XIIb)

Harappan contacts with Central Asia are now beyond doubt especially after the discovery of; (1) a few Harappan pottey types in Namazga V sites, (2) a Harappan inscribed seal at Altin Depe, (3) comparable ivory objects at Altin Depe, and (4) a close similarity in a few copper artefacts (Gupta 1979: Vol. 2).



"The discovery in Altyn-Depe of a proto-Indian seal with two signs deserves special mention. V.M. Masson pointed out, that what the seal depicted was a pictogram and not just a representation of animals. In his opinion this means that some of the ancient residents of Altyn-Depe were able to read this

text.(G. Bongard-Levin, 1989, Archaeological Finds in Central Asia throw light on Ancient India, Jagdish Vibhakar and Usha Gard (Eds.), *Glimpses of Ancient India through Soviet Eyes*, Delhi, Sundeep Prakashan).

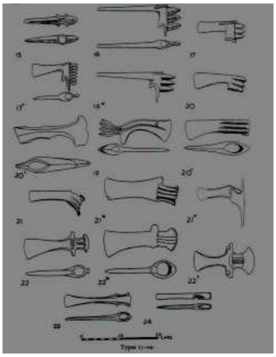


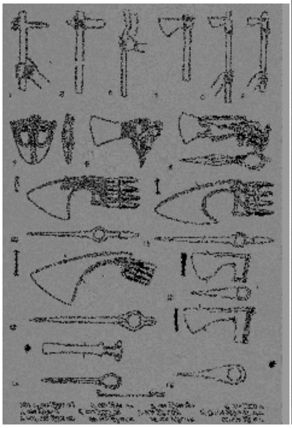
Map of Central Asia during the Bronze Age

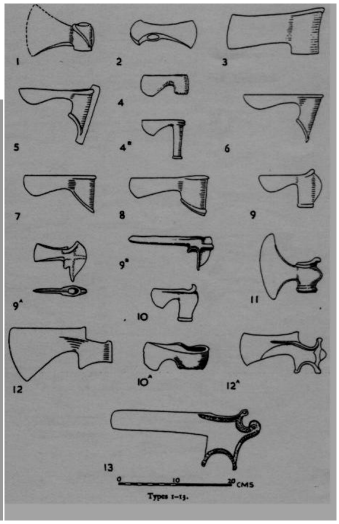
Bronze artefacts found in Parkhai cemetery II: double-edged knives, small fragments and spiral-headed pins; the pins of different sizes had spirals no fewer than four lops; six spiral-headed pins are known from the northern foothills of Kopet Dagh; one came from Kysyl Arvant and dated to Namazga IV period; all identical to the Parkhai examples and considered an import from the Sumbar Valley; the remainder---two from the southern mound at Anau, two from Namazga-depe and one from Shor-depe—had small loops twisted only 1.5-2 times. They were found in Namazga V levels from cemeteries in northern Afghanistan and Tajikistan. Slightly twisted spiral-head pins from Mundigat (periods IV, I-IV, 3) and multi-looped spiral-headed pins from Tepe Hissar (period IIB), which are identical to those from Parkhai II, are also related to this period; the dates of Parkhai finds are ca. middle of the third millennium B.C.

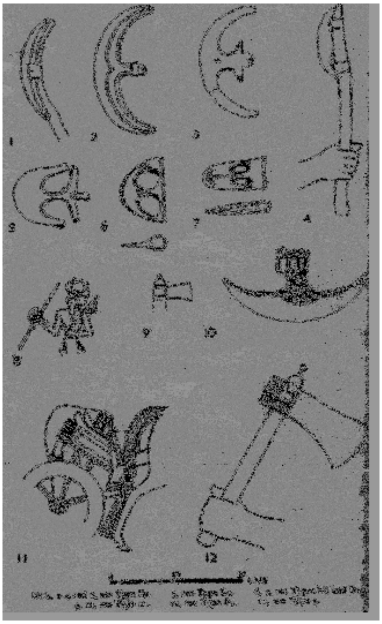
"Before we turn to the Indian subcontinent, we must tackle the obvious problem of the relationship with the Indo-Aryans of Western Asia and those of India itself. Of the three possibilities, received opinion rejects two of them. It is highly improbably that the Indo-Aryans of Western Asia migrated eastwards, for example with the collapse of the Mitanni, and wandered into India, since there is not a shred of evidence—for example, name of non-Indic deities, personal names, loan words—that the Indo-Aryans of India ever had any

contact with their West Asian neighbours. The reverse possibility that the main line of migration was into India and that a small group broke off and wandered from India into Western Asia is readily dismissed as improbably long migration, again without the least bit of evidence." (Mallory, J.P., 1989, *In Search of the Indo-Europeans*, London, p. 42).

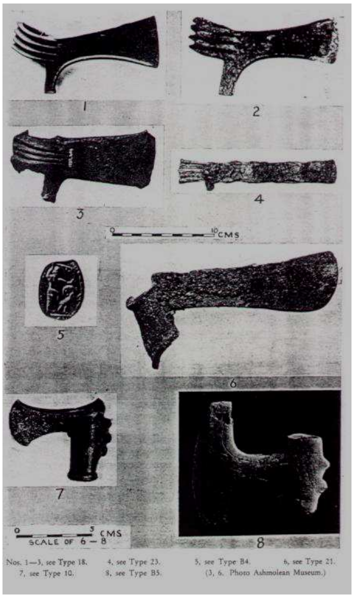








West Asia axes, Plate XXXIVWest Asia axes, Plate XXXVWest Asia axes, Plate XXXVI, Plate XXXVII (Plates from: Rahel Maxwell-Hyslop, Western Asiatic Shaft-hole axes, in: ***Iraq*** XI, 1949).



West Asia axes, Plate XXXVIIIWest Asia axes, Plate XXXIX (Plates from: Rahel Maxwell-Hyslop, Western Asiatic Shaft-hole axes, in: ***Iraq*** XI, 1949).

"It is clear that the vexed problem of the Luristan axes cannot be solved until many tombs containing axes associated with material than can be closely dated, have been properly excavated and recorded. In the vast amount that has been written on Luristan bronzes there is still extremely little dating evidence evidence, and in this study I have attempted to relate certain Luristan axes to those Asiatic types of which stratified samples exist...

"Simple shaft-hole types: Type 1 Shaft-hole axe with wide splayed blade and cutting edge parallel to the shaft; Babylonia: Jamdat Nasr (Mackay, pl. LXXV, Jamdat Nasr period (ca. 3200-3000 BC), Al'Ubaid (Childe, in ESA, IX, Fig.3. Painted clay model. Early Dynastic Period (ca. 3000-2700 BC), Eridu (RLA, 2, Taf. 63, Clay model), Lagash (De Sarzec, Decouvertes en Chaldee, Pl. 45, 6. clay model. Early Dynastic period (ca. 3000-2700 BC), Ur (Woolley, pl. 223, U. 15314, Early Dynastic III Period (ca. 2700-2400 BC); Anatolia: Bogazkoy (Przeworski, M.A., Taf. XI,4) (Plate XXXIV, 1) The technique of casting a single axe blade with with a vertical socket for the shaft made in one piece with the blade must have been known as early as the Al'Ubaid period, although there are no metal socketed axes of this period extant. But we have models from Al'Ubaid and Jamdat Nasr and these show that smiths could produce a simple type of shaft-hole axe with an oval-shaped socket and a wide straight edged blade. Round sockets are found on double axes of stone from Al'Ubaid levels at Arpachiyah and on a clay model of an axe, probably of stone, from the site of Al'Ubaid itself. The primitive shaft-hole form with oval-shaped socket is confined to Babylonia and the only example outside this area comes from Bogazkoy (Plate XXXIV, 1)

"Type 2 (Anatolia: Ahlatlibel. T.T., II. Ab.354 and 383. Bittel in A.F.O., XI, 12936, Fig. 7, pl. 2)(Plate XXXIV,2). In Anatolia the earliest metal shaft-hole axes are two copper examples from Ahlatlibel which have been dated by Bittel to ca. 2500-2000 BC. The blade has convex sides and splayed cutting edge and is pierced by an oval shaft hole. There is no attempt to extend the socket down the shaft and the butt of the blade is curved and could have been used as a hammer. It is not a form well suited for casting in metal and the smith must have had a stone prototype in mind. In the Early Dynastic and Sargonid periods in Babyloina the socketed bronze axe along with the bow and lance became an

important weapon of war and the simple form with rectangular blade set at right angles to the shaft hole, as well as the more advanced types 5,6,7 and i (Plate XXXIV, 5-8) is known not only from extant examples, but also from reliefs. The enemies of the Akkadians, the Lulubu, inhabitants of the Zagros mountain sused the same kinds of axes and the products of Akkadian metalsmiths must have been fairly common among the Eastern tribesmen. The two Luristan examples catalogued below may both belong to the Akkadian period and it is worth noting the figure on the rock relief at Darband i Shaikha_n, near Ho_re_n at the foot of the Zagros mountains who uses a curious weapon (Plate XXXVI, 4), with wide splayed blade and heavy moulding round the shaft hole edges...we know that Akkadian smiths could make shaft-hole axes which were used in warfare as the Lagash relief shows Type 3 carried by a soldier, and at the time of the Third Dynasty of Ur, this type was used again as is shown by the Ur Nammu stele from Ur...Reliefs from Ashurnas.irpal's palace at Nimrud shows the type with blade set at right angles to the shaft and no shaft tube for the socket. It is carried on the king's chariot as a hunting weapon (see Plate XXXVII, 11). But while the Elamites are portrayed fighting the Assyrians with socketed axes, for the Assyrian soldiers the axe was not as important a weapon as the short sword and was used more as a pioneering tool by the Assyrian charioteers who carried it in their weapon carriers. An interesting example comes from Luristan now in the Savory collection (Archaeologia, 88, pl. LXXII, 5). This is a heavy, well-made axe, certainly not made for ceremonial purposes but for use, and Przeworski has suggested that it may be the prototype of the Tall Sifr example. (British Museum, Bronze Age Guide, Fig. 186). The Tall Sift hoard has been dated to many periods from 2000 BC to 1200 BC, but a date in the Early Dynastic III or the Third Dynasty of UR period is more probable. The weapons are all copper and an adze is very similar to an example from Luristan, now in the Brussels Museum, inscribed with the name of Gimil-sin of the Third Dynasty of Ur. Another axe from Sippar, now in the Brussels Museum, is an interesting, though unstratified example of this type with clearly marked mouldings rond the base of the socket (Plate XXXVIII,6).

Type 3. The blade is long and rectangular in shape and in most examples the socket does not protrude below the level of the lower edge of the blade. Babylonia: Ur (Woolley, pl. 223. U. 11915. Early Dynastic III period (Plate XXXIV.3); Ur (British Museum, No. 118054); Lagash (Sarzec, Dec. en Chaldee, pl. 5 bis. Relief. Sargonid period); Sippar (Brussels. Musees Royaux. No. 0350. Plate XXXVII,6). BMAH, May 1932, p. 61); Tall Sift (British

Museum Bronze Age Guide, FIg. 186; Guide to the Iraq Museum, pl. XXIV, IM. 10776); Iran: Luristan (Przeworski, in Archaeologia 88, pl. LXXII, 5. Savory collection); Luristan (BMAH, Jan-Dec. 1946, p. 3, Fig.u); Susa (DPM, I, Fig. 263); Naram-Sin stele (Contenau, Manuel, II, Fig. 469, Sargonid period (ca. 2400-2200 BC); Darband i Shaikha_n nr. Ho_re_n Rock relief (Contenau, Manuel, I, Fig. 47 (Plate XXXVI, 4).

Type 4. (Plate XXXIV, 4, 4b; Plate XXXVI, 13; Plate XXXVII,2). The top of the balde and socket in a straight line: the lower edge of the blade is cut away leaving a narrow width between the junction of socket and blade. (Iran: Tepe Khazineh: DPM, VIII,Fig. 308, Early Dynastic I period; Luristan: Cambridge, Museum of Archaeology, Nos. 34, 910: Plate XXXVI, 13; Tepe Giyan: Contenau, pl. v, 4. Level IV, ca. 2300-2000 BC). The edge of the blade was curved and this shifted the point of impact on the cutting edge. Early examples of this occur in tombs in the Musyan region; the Tepe Khazineh example is associated with 'Scarlet ware' and therefore should belong to the Early Dynastic I period (Plate XXXIV, 4). Metal is not common in these tombs but while the stratification is uncertain, when this example is compared to dated Early Dynastic III types, it seems likely that it should belong to the earlier period. Other examples and variants also from Iran where the type has a long history. Tomb 104 at Tepe Giyan has yielded a similar axe with a slightly longer shaft tube which belongs to Level IV and may be dated to about 2300-2000 BC.



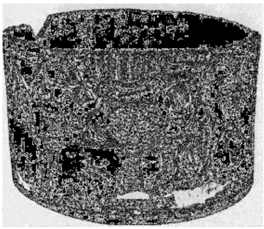
Type 5, 6, 7 and 8 (Plate XXXIV, 5-8; Plate XXXVII, 1; Plate XXXVI, 5, 6, 15). Type 5: socketed axe with cutting edge on under side of blade and flange at outer edge of socket (Babylonia: Ur. Woolley, pl. 223, U. 1187. Early Dynastinc III period; Woolley, pl. 223, U. 8065. Early Dynastic III period; Kish. Mackay, Part II, pl. LXII, 1. Early Dynastic III period; Ur. Woolley, pl. 223, U. 11701. Early Dynastic III period; Stele of the Vultures: De Sarsec, Decourvertes en Chaldee, pl. III, bis. Plate XXXVI, 6; Early Dynastic period; Ur. Woolley, pl. 223, A. 2b. Early Dynastic III period) In the Early Dynastic III period, Sumerian metalsmiths developed

the socketed axe from the simple Type 3 and by the time Ur cemetery were producing welll-made, technically advanced models in bronze, gold and electrum. Earlier examples at Ur were probably cast in a two-piece mould and the flange on the outside of the socket gave added strength to the shaft. Typologically later types do not show this flange but keep the feature of the tubular collar at the top and bottom of the socket. On the Stele of the Vultures, Type 5B with the flange is shown as well as TYpe 8 (see Plate XXXVI, 5,6). In Types 5 and 6, the cutting edge was on the underside of the blade which was set at an acute angle to the shaft. When compared to Type 3 the effectiveness of these blades seems doubtful, yet they are portrayed on the Ur standard, as carried by Sumerian soldiers and therefore must have been used for warfare. In Types 7 and 8, the cutting edge is shifted to the front of the blade; the shaft hole is broader and Type 8, as shown on the Stele of the Vultures (Plate XXXVI, 5) and the Ur standard, is obviously a serviceable weapon. Important stratified examples of Type 8 come from Til Barsib. Examples of Type 6 from Tepe Ali Abad, near Musyan, are of Early Dynastic date and the unstratified Luristan axes of Type 6 have exactly similar blades and sockets. The Susa example of Type 8 is important for dating purposes. It was found inside a copper vesel with two adzes and a flat axe blade in a level which can be dated with fair certainty to the Third Dynasty of Ur period. The Cambridge Luristan axe (Plate XXXVI, 15) is almost exactly similar and it is unlikely that these Luristan axes and the Iranian example from Kirmanshah (Type 7) are much later than 2100-1900 BC.)

Crescent axe in Egypt of Asiatic origin, Twelfth Dynasty painting.

Crescent axes, e-shaped blades and balberds (Plate XXXVII, 1-4, 8). The simple curved blade found at Ur (Plate XXXVI, 1) in the tomb of Queen Shub-aid, can be regarded as the earliest form of both the curved sword or scimitar and the crescent axes and e shaped blades. This blade was fixed to a wooden handle by a rivet driven through the handle at either end and by a band of gold which passed round the handle and was rivetted to the centre of the blade. An inlaid plaque from Kish shows this weapon held by the king in his left hand (Mackay, Part I, Pl. III). In its more developed e shaped form the blade is practically semicircular and has a definite projecting central tang. When riveted to the wooden shaft, two openings would result and this characteristic is found on all the latter axes of this class. Both the e shaped and crescent axes were evidently important weapons of war. A relief discovered at Ur (Smith, Early History of Assyria, Pl. 5, p. 73) certainly contemporary with or earier than the

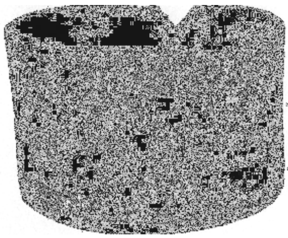
First Dyansty of Ur shows two e shaped axes of developed type in the weapon-carrier of a chariot and later Sargon of Akkad's soldiers use the simpler form (Plate XXXVI, 4). In this style, the axe is portrayed in Egypt on a Predynastic stone vase and was later used in the Twelfth Dynasty period (Scharff, Die Altertumer der Vor-und Fruh-zeit Agyptens 2, Taf. 22, N. 108)...Evidently the idea of making this axe with a socket was of Asiatic origin as on a Twelfth Dynasty painting, where Egyptians carry blades of this type hanted into the handle; the Syrians in the same scene carry a socketed axe (cf. Petrie, T.W., pl. VI, 173).



Khafajeh bowl; fight of lion and bull (BM 12887).

Khafajeh bowl; a man sitting, with his legs bent underneath, upon two zebu bulls. This evokes the proto-Elamite bull-man; the man holds in his hands streams of water and is surrounded by ears of corn. He has a crescent beside his head. On the other side of the bowl, a man is standing upon two lionesses and grasping two serpents.



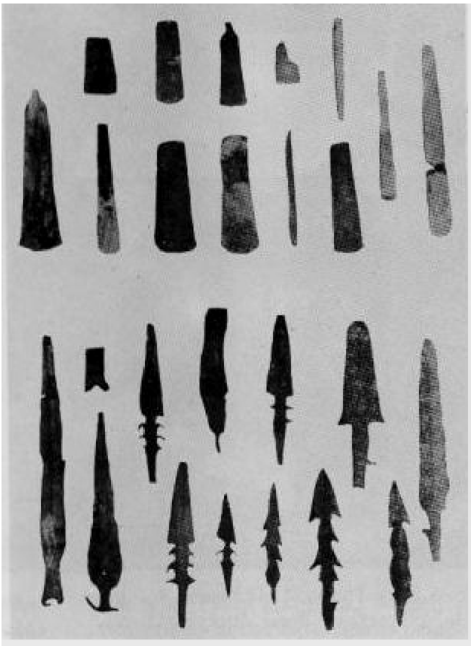


Shortughai. Francfort provides a succinct account of the evolution of the settlement in Shorthughai at the end of the 3rd millennium. Shorthughai is located at a distance of 5 kms. from the Amu Darya river and about 25 km. from the Kokcha river. The site was on virgin soil indicating that no one had lived on this plain before the Harappans. The material discovered in this plain shows no relation to the Bactria-Magdiana complex but to the contemporaneous but far distant Harappan Civilization. Both painted and unpainted ceramics are typical Harappan with painted motifs of intersecting circle, papal leaves, fishes, peacocks. Terracotta cakes, spoons, toy cards are typical Harappan. Copper objects include a small number of pins, fragments and a discoidal mirror. Clay crucibles were discovered with traces of copper inside, indicating small scale metallurgy. Some pieces of gold and lead collected in the same layers mixed with charcoal and burned river stones were also found. A discoidal gold bead was found perforated along its diameter. Evidence of use of lapis lazuli, agate, cornelian, steatite was found. A number of seashell bangles were found. Walls

are built of mud bricks, like Harappan sites. A ploughed field covered with flax seeds was discovered. Sondages dug revealed small irrigation canals. Harappan stone seals and etched cornelian beads have been found in the looted graveyards of Bactria (Tosi, M., 1979: Proto-urban cultures of Eastern Iran and Indus Civilization, in: *South Asian Archaeology*, M. Teddie ed., Naples, 164, fig.3). Harappan presence in Central Asia is thus evidenced by the Shortughai I settlement and by antiquities from Turkmenia and Bactria. (H.P. Francfort, The Harappan Settlement of Shortughai, in: B.B.Lal and S.P Gupta, eds., *Frontiers of Indus Civilization*, 1984, pp. 301-310).

Dark grey steatite bowl carved in relief. Zebu or brahmani bull is shown with its hump back; a male figure with long hair and wearing akilt grasps two sinuous objects, representing running water, which flows in a continuous stream. Around the bowl, another similar male figure stands between two lionesses with their head turned back towards him; he grasps a serpent in each hand. A further scene (not shown) represents a prostrate bull which is being attacked by a vulture and a lion.

The zebu is reminiscent of Sarasvati Sindhu seals. The stone used, steatite, is familiar in Baluchistan and a number of vessels at the Royal Cemetery at Ur were made out of this material.



The bowl dates from c. 2700-2500 B.C. and the motif shown on it resembles that on a fragment of a green stone vase from one of the Sin Temples at Tell Asmar of almost the same date.

India. Copperhoard implements: chisels, harpoons, swords from Ganga_-Yamuna_ doab

Gypsies, travelling metalsmiths and metalsmith guilds

"...there are few reliably dated examples and the fact that many types of bronze axe remained in use over several centuries shows how unwise it is to attempt to date these axes by typological analogy.. The question of craftsmen's guilds also needs consideration and many isolated examples of certain types can almost certainly be explained by the activities of individual members of these guilds travelling along the Asiatic trade routes. In the ancient East presumably the same conditions were enjoyed by metalsmiths as to-day are found among the Sulaba_, the travelling blacksmiths of the desert who are granted a certain immunity by the Beduin and can trespass on tribal land on account of their useful activities. If in periods of invasion and war metalsmiths were the only people able to travel easily, this may explain the curious distribution of some of these types of metal axe.

Study of the origins and dispersals of and continuity and discontinuity among Proto-Indo-European peoples has engaged a number of scholars over a hundred and fifty years. Two major methods used in the study are: archaeology and language.

Archaeological method and linguistic method have been based on a number of theoretical assumptions which result in differences in interpretations of data.

“There is no river of Afghanistan mentioned in the R.gveda which does not flow into the Indus. However, in a wider perspective, we find Afghanistan, South Central Asia, West Turkistan, Kazakistgan, (Azerbaydzhan) Iran (Mandas in western Persis, 2500 BC and Zarathustrians in central Iran), Turkey (Hittites in the second millennium BC), Syria, Palestine (Mitannis, 1400 BC), and Babylonia (Kassites, 1760 BC) related linguistically and commercially, directly and immediately to the Vedic Indians as well as the Harappans...No serious attempt appears to have been made for proper assessment of the relative position of Harappan traders in the contemporary world which, in view of the spread of Indo-Aryan languages and vestiges of their colonies in and around the great civilizations of West Asia, must have been hegemonic. Although linguistic testimony is meager, the impact on both Babylonian and Assyrian mythology and rituals as noted by competent authorities on the subject (Carnoy, Albert Jr., 1917, *Mythology of All Races, IV, Iranian Mythology*, Boston)...Afthanistan has been so thoroughly Aryanised that till the Greek times it was called A_rya_na_...Why is there no archaological evidence of the presence of Aryans in India? And the answer comes with a resounding echo:

Because Harappan archaeology is hardly different from the Vedic one. We find almost the same geographical area occupied by the 'Aryans' as is covered by the material remains of the Harappans. Almost the same area is covered by the Indo-Aryans and Indo-Iranians abroad as was being explored and exploited by the Harappans for mineral wealth." (Bhagwan Singh, 1995, *The Vedic Harappans,* New Delhi, Aditya Prakashan, pp.47-49).

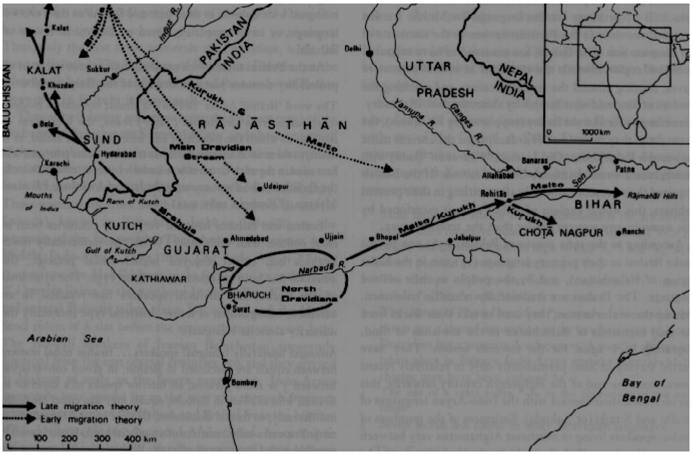
Indo-European languages have common vocabulary for semantic categories: parts of the body, family relationships and numerals. This is a very strong semantic evidence which led to the postulation of a hypothesis that the original homeland of the people speaking the Indo-European languages should have been in Central Asia with migrations westwards towards Europe and southwards towards Iran and India.

Bronze Age can be dated to ca. 1800 to 700 BC overlapping with the later Iron Age and with the earlier Neolithic/Chalcolithic Age. The chronology is not strict and is not linear in many areas of Asia. An acceptable method has to be found to relate the changes in languages to the changes in culture and technology surmised from archaeological evidence.

"No Proto-Indo-European text exists; their physical remains and material culture cannot be identified without extensive argument, and their geographical location has been the subject of a century and a half of intense yet inconclusive debate...Indo-European is fundamentally a linguistic concept...any cultural (pre)historian has certain obligations to the evidence of comparative linguistics..Joseph Scaliger (1540-1609), for example, attempted to divide the languages of Europe into four major groups, each labelled after their word for 'god'. The transparent relationship of what we today call the Romance languages was recognized in the deus group (for example, Latin deus, Italian dio, Spanish dio, French dieu), and contrasted with the Germanic gott (English god, Dutch god, Swedish gud, and so on); Greek theos; and Slavic bog (such as Russian bog, Polish bog and Czech buh)...

"The Assyrian merchants of the nineteenth century BC not only record the names of Indo-European peoples in their texts but make it quite clear that there was also a great body of non-Indo-European-speaking peoples in the region...

"Further to the east, on the fringes of Anatolia and north Syria, lay another major non-Indo-European people, the Hurrians. Hurrian texts maintained in the Hittite archives, coupled with Hurrian loan words in Luwian and the Hurrians' own inscriptions and texts in north Mesopotamia which date as early as the twenty-third century BC, all speak for an additional non-Indo-European presence on the eastern borders of the Indo-Europeans of Anatolia..."(J.P. Mallory, ***In Search of the Indo-Europeans: Language, Archaeology and Myth***, London, Thames and Hudson, 1989).



Two views of the formation of North Dravidian. After Elfenbein, J.H., 1987, A periplous of the 'Brahui problem', Studia Iranica, 16; pp. 215-33. This pattern of separation of the Brahuis is consistent with the suggestion earlier made by Jules Block that the Brahuis came to Baluchistan from South or Central India where other cognate languages were spoken. The vocabulary of Brahui is strongly influenced by Sindhi and Siraiki with substrate Indic words which find many cognates in Marathi, Gujarati and Kurukh languages; these verily constitute the substram Pra_kr.ts which influenced Vedic Sanskrit with words such as khala (threshing floor), la_n:gala (plough)..

"The approaches of the historic and prehistoric archaeologists as well as the anthropologically oriented ones to the problems of culture continuity and discontinuity are strongly influenced by their concepts of the structure of the past, such as the way they conceive past developments in terms of the succession of cultures and civilizations...The past is thought of as a linear development extending from the civilizations of Egypt and Southwest Asia through the civilizations of Greece and Rome to those of the western medieval world (Bernheim 1908: 70-74)...The Latin, Greek, Hittite, Iranian and Indic peoples are placed within the framework of successive civilizations whose validity is established upon a priori historical grounds...It was only following the decipherment of Hittite that these continuities could be pushed into the

middle and even the early second millennium BC. This together with the discovery of Indo-Iranian, Proto-Indic, or Mitannian Aryan names in Akkadian and Hurrian texts (Thieme, P. 1960, The 'Aryan Gods' of the Mitanni Treaties, *Journal of the American Oriental Society* 80: 301-317); Crossland, R.A., 1971, Immigrants from the North. In the Cambridge Ancient History, edited by I.E.S. Edwards, C.J.Gadd and N.G.L. Hammond, 3rd ed., Chapter 27, vol. I, part 2, pp. 824-876. Cambridge: University Press), led many to believe that Greek must extend back to the equally early Myceanaen period. However, it took the decipherment of Linear B by Ventris to convince the last doubters that the Mycenaeans spoke Greek... during the early and middle nineteenth century, the Thomsen succession of Stone, Bronze and Iron Ages became the basis for the development of a structure for the past...

"For the period when the Indo-Europeans are first known in Southwestern Asia, the historically oriented arcaheologist is primarily concerned with town, temple, palace and cemetery complexes which, with the exception of the cemetery, are missing in Europe. This explains the frequent preoccupation with architecture, painting, sculpture and the significant minor arts, such as vase painting and metal work. Methods are therefore, focussed upon stylistic and iconographic analysis...

"Most archaeologists and linguists assume that the Indo-European languages formed during the Neolithic. A few, such as Kuhn (1935) and Schachermeyr (1955), who have sought an earlier origin, have been shunned by most archaeologists because of the quite different type of evidence available for the Mesolithic and Paleolithic, as well as the widely held linguistic assumptions concerning the context of the formation of Proto-Indo-European... with calibrated radiocarbon dates, it can be shown that the earlist Neolithic is separated from the latest Paleolithic by only 3,000 years in Southwestern Asia...With the Neolithic age, archaeological evidence comes from villages, burials and cemeteries rather than from campsites, rock shelters and caves...The archaeological evidence association with the Indo-Iranians is thin, forcing even archaeologists to support their theories with linguistic and historical evidence. This complex situation enables us to understand the difficulties encountered in the search for an Indo-European homeland in Southeast Europe and adjacent areas of Asia Minor (Palmer 1955), Central Europe and east (Bosch-Gimpera 1961) or on the steppes of southern Russia (Glob 1944: 202-240; Gimbutas 1965, 1970, 1978, 1980)...

"Progress towar the solution of the problems of continuity and discontinuity , which are so important for the Indo-European problem, can only be achieved after the possibilities of diffusion, trade and migration have been weighed against those of transformation" (Klejn, 1977, A Panorama of Theoretical Archaeology, **Current Anthropology**, 18, 1: 1-42). (Homer L. Thomas, The Indo-Europeans--some historical and theoretical considerations, in: Skomal, Susan Nacev and Edgar C. Polome (eds.), *Proto-Indo-European: the archaeology of a linguistic problem, Studies in honor of Marija Gimbutas*, Washington DC, Institute for the Study of Man, 1987, pp. 145-164).

The strongest evidence for the migration is the name of the Croatians who are a people mentioned in the Behistun inscription as Hravaits, a clear derivative from Sarasvati River Basin -~ Haraquaiti region, which link is logical in the context of the evidence of the earth sciences of the course of the 1600 kms. long Himalayan river called Sarasvati_. In the continuing search of the Indo-Europeans, the people of the Sarasvati_ River valley dated ca. 3500 BC are likely to be the oldest representatives who evolved and sustained a continuity of culture into the historical periods and into the present day civilization of India and who ventured into West Asian lands in search of mineral resources and trade in products of the bronze age.

Sarasvati Civilization, a Linguistic Area ca. 9000 (Mehergarh) to 3000 (Ganga-Yamuna Doab) Before Present

“Indra and rus’ama_ made a wager: ‘Which ever of us shall first run around the earth shall be the winner.’ Indra ran around the earth, rus’ama_ ran around Kuruks.etra (only).” (Pan~cavim.s’a Bra_hman.a 25.13) This anecdote in the Bra_hman.a indicates that Kuruks.etra was identified with the whole earth (cf. Hoffmann, Aufsaetze zur Indo-Iranistik, ed. J. Narten, Vol. 1, Wiesbaden 1975, p. 7). Kuruks.etra on the banks of the Sarasvati_ river was the place where sacrifices and long sattra rites were held. The river herself was the personification on Earth of the goddess Sarasvati_. The name of the Milky Way in the Vedic texts is Sarasvati_. This Milky Way fell on the earth at the Plaks.a Pras’ravan.a, the world tree at the centre of heaven and earth. One span north of Plaks.a Pras’ravan.a (the plaks.a tree of ‘forth streaming’) is the very centre of both heaven and earth according to Jaimini_ya Bra_hman.a. Then, the river Sarasvati_ flows through the land of the Kuru people. (The concept of Kuruks.etra occurs in Maitra_yan.i Sam.hita_ 2.1.4, 4.5.9; in Aitareya

Bra_hman.a 7.30; S'atapatha Bra_hman.a, Jaimini_ya Bra_hman.a, Pan~cavim.s'a Bra_hman.a, Kat.hopanis.ad and Taittiri_ya A_ran.yaka 5.1.1 (which describes the borders of Kuruks.etra); reference to devayajn~a occurs at S'rauta su_tra 10.5.15-20, Paippila_da Sam.hita_ 16.129.1-5, Maitra_yan.i Sam.hita_ 1.1.8, Kat.ha Sam.hita_ 1.7, Taittiri_ya Sam.hita_ 1.2.3). Maitra_yan.i Sam.hita_ (2.1.4:5.9) is emphatic: **deva_vai sattram a_sata kuruks.etre**. (Also Cha_galeya Upanis.ad: Om, r.s.ayo vai sarasvatya_m satrama_sata; tetha kavas.amailu_s.am da_sya_h putra iti di_ks.a_ya_ a_cchidan; te hocuh). The sacrifices and rituals are conducted on the banks of Sarasvati River and also the banks of the Dr.s.advati_ River. (Pan~cavim.s'a Bra_hman.a 25.13, Jaimini_ya Bra_hman.a, La_t.ya_yana S'rauta Su_tra). Pilgrimages involving long treks are made along these two river banks; the pilgrimages lead to heaven as the heavenly river, Sarasvati_, the Milky Way was flowing down from this spot about the time of the winter solstice, when the Maha_vrata begins. [The Maha_vrata involves a mock ritual of a conflict between an a_rya and a s'u_dra: A_pastambha S'rauta Su_tra 21.17.] The twin rivers thus were like two branches touching the north-eastern horizon, the 'gate' to heaven. The are encompassed by the two rivers, Sarasvati_ and Dr.s.advati_ were verily the centre of the whole world. After the victory of the Bharata King Suda_s, he settled on the Sarasvati_ which was located vara a_ pr.thivya_h, that is, 'at the best place of the earth' (Rigveda 3.53.11), 'at the navel of the earth' (RV 3.23.4: ni tva_ dade vara a_ pr.thivya_, il.a_ya_s pade. Suda_sa offers the best place on earth: atha__ yaja_te vara a_ pr.thivya_h (RV 3.23.4). The Plaks.a Tree is the central world tree which pushes up heaven.

Other rites took place 'at the back of Kuruks.etra' at Parisaraka or Pari_n.ah where the river Sarasvati_ disappeared in the desert.According to O.P. Bharadwaj, the reference in Aitareya Bra_hman.a to Parisaraka may be a later date after the desiccation of the Sarasvati Riiver. In this Bra_hman.a, Kavas.a Ailu_s.a is expelled in the desert away from the Sarasvati_ so that he would die of thirst. Kavas.a saw the Aponaptri_ya hymn as a result of which the waters of the Sarasvati_ burst forth all around him and he was saves. The spot where the waters of the Sarasvati_ surround him is named Pariaraka; this is later known as the Saraka Ti_rtha (MBh. Vana. 83.75; 76; 81; Va_mana Pura_n.a, sm. 15.18). Bharadwaj surmises that this Parisaraka or Saraka may be in the region of Vinas'ana.

An alternative view could be that the Pari_n.ah may be a reference to Pa_ripa_tra. "Pa_ripa_tra is the western part of the Vindhya range extending

from the course of the Chambal to the Gulf of Cambay (*Asiatic Researches*, vol. VIII, p. 338); according to Dr. Bhandarkar it is that portion of the Vindhya range from which the rivers Chambal and Betwa take their rise (*History of the Dekkan*, see.III; Vara_ha Pura_n.a, ch. 85). It comprised the Aravali mountains and the hills of Rajputana including the Pathar range which is perhaps a contraction of Pa_ripa_tra. It appears to have included the countries of Apara_nta, Saura_s.t.ra, S'udra, Ma_lapa (Ma_lava), Malaka and others (Ku_rma Pura_n.a, Pu_rva ch. 47), in short a great portion of the western coast of India. According to the Ra_ma_yan.a, Pa_ripa_tra or Pa_riya_tra was situated on the western sea (Kishkinda_ Ka_n.d.a, ch. 42, v.20; Pa_riya_tra = Pa_ripa_tra: Va_mana Pura_n.a, ch. 13; Brahma_n.d.a Pu_ra_n.a, pt. II, ch. 16)." (N. Dey, 1979, *The Geographical Dictionary of Ancient and Medieval India*, Delhi, Cosmo Publications, p. 149). This equivalence and the pattern of movement of the people away from the Sarasvati and Dr.s.advati_ towards the Chambal indicates the possibility that the name vais'ambha_lya of Sarasvati_ river may indeed refer to the shortened popular form: Chambal River. Zimmer notes that Kavas.a was the Purohita of the joint tribes named Vaikarn.a who comprised the Kuru Pa_n~ca_las. (cf. *Vedic Index*, Vol. I, p. 143).

Without entering into detailed arguments into convergence in structure and idiom among the Indian languages and also into divergence from 'ancestries' proposed for language families (categorized provocatively as 'genetic' stocks), it is hypothesized for the purpose of the decipherment effort that the Sarasvati Civilization area, ca. 9000-3000 BP (i.e. the evolution and stabilization of the chalcolithic and bronze ages) constituted a Linguistic Area. Based on this hypothesis, the vocabulary of all languages of Bha_rat are a resource-base for using the rebus method to tag pictograms with identified homonymous lexemes.

An important test for a 'successful' decipherment is that a sign or pictorial should be explained consistently on a variety of inscribed objects. The inscriptions are classified by types of object carrying the inscription.

There are also signs which indicate that they are beginning markers, some of these signs have two short strokes affixed in an upper register, to the left of the signs, for e.g.,

The combined pair of signs may be read, for e.g. , as sagar. (wheel) san:gad.a (two), meaning, ‘battle-car’.

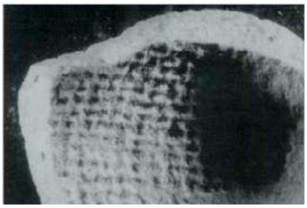
The script, which was generally written from right to left, is known from the 2,000-odd short inscriptions so far recovered, ranging from single characters to inscriptions of around 20 characters. There are more than 500 signs, many appearing to be compounds of two or more other signs, but it is not yet clear whether these signs are ideographic, logographic, or other. Numerous studies of the inscriptions have been made during the past decades, including those by a Russian team under Yuri Knorozov and a Scandinavian group led by Asko Parpola. Despite various claims to have read the script, there is still no general agreement.

The Harappans also employed regular systems of weights and measures. An early analysis of a fair number of the well-formed chert cuboid weights suggested that they followed a binary system for the lower denominations--1, 2, 4, 8, 16, 32, 64--and a decimal system for the larger weights--160, 200, 320, 640, 1,600, 3,200, 6,400, 8,000, and 12,800--with the unit of weight being calculated as 0.8565 grams. However, a more recent analysis, which included additional weights from Lothal, suggests a rather different system, with weights belonging to two series. In both series the underlying principle was decimal, with each decimal number multiplied and divided by two, giving for the main series ratios of 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100, 200, 500(?). [1994-1998 ***Encyclopaedia Britannica***].

For the trade with Mesopotamia there is both literary and archaeological evidence. The Harappan seals were evidently used to seal bundles of merchandise, as clay seal impressions with cord or sack marks on the reverse side testify. The presence of a number of Indus seals at Ur and other Mesopotamian cities and the discovery of a "Persian Gulf" type of seal at Lothal--otherwise known from the Persian Gulf ports of Bahrain (ancient Dilmun, or Telmun) and Faylahkah, as well as from Mesopotamia-- provide convincing corroboration of the sea trade suggested by the Lothal dock. Timber and precious woods, ivory, lapis lazuli, gold, and luxury goods such as

carnelian beads, pearls, and shell and bone inlays, including the distinctly Indian kidney shape, were among the goods sent to Mesopotamia in exchange for silver, tin, woolen textiles, and grains and other foods. Copper ingots appear to have been imported to Lothal from Magan (possibly Oman, the Mahran region, or southeastern Iran). Other possible trade items include products originating exclusively in each respective region, such as bitumen, occurring naturally in Mesopotamia; and cotton textiles and chickens, major products of the Indus region not native to Mesopotamia.

Harappa: finely spun thread and tightly woven fabric visible in this impression from the interior of a faience vessel (After Kenoyer, J.M., 1998, Fig. 8.29). Examples of cotton thread were found at Mohenjodaro preserved by metal



salts. Traces of cotton fabric were found adhering to a corroding silver jar at Mohenjodaro. Examples of thread and fabric of cotton were also found on copper tools. (Marshall, 1931, *Mohenjodaro and the Indus Civilization*. Probsthain, London; A.N.Gulati and A.J. Turner, *A note on the early history of cotton*, Bulletin 17, Technological Series 12, Bombay, Indian Central Cotton Committee, 1928; Mackay, Ernest J.H., 1938, *Further Excavations at Mohenjodaro*, New Delhi, Government of India Press, 440). “At Harappa possible cotton threads were found wrapped around the handle of a small copper mirror from a female burial and also around the handle of a curved copper razor.” (Kenoyer, J.M., 1998, p. 159).

Mesopotamian trade documents, lists of goods, and official inscriptions mentioning Meluhha (the ancient Akkadian name for the Indus region) supplement Harappan seals and archaeological finds. Literary references to Meluhhan trade date from the Akkadian, Ur III, and Isin- Larsa Periods (i.e., c. 2350-1800 BC), but as texts and archaeological data indicate, the trade probably started in the Early Dynastic Period (c. 2600 BC). During the Akkadian Period, Meluhhan vessels sailed directly to Mesopotamian ports, but by the Isin-Larsa Period, Dilmun (modern Bahrain) was the entrepôt for Meluhhan and Mesopotamian traders. By the subsequent Old Babylonian period, trade between the two cultures evidently had ceased entirely. (see also Index: 3rd Dynasty of Ur)

The frequencies in parenthesis are based on Mahadevan conordance (which excludes objects that do not contain a 'sign'); the actual numbers will be higher

based on the more comprehensive Parpola photo corpus which includes inscriptions containing only pictorials.

Seals (1814)
Tablets (in bas-relief or inscribed) (511)*[including Seal Impressions]
Miniature tablets (of stone, terracotta or faience) (272)
Copper tablets (135)
Bronze implements/weapons (11)
Seal Impressions*
Pottery graffitii (119)
Ivory or bone rods (29)
Inscribed on Stone, Bracelets, Ivory plaque, Ivory dice, Carnelian tablet, Terracotta ball, Brick (15)
Display Board (Dholavira or Kotda with 10 signs, possibly atop a gateway) (1)

Note: The average number of signs per inscription is only five for the entire corpus.

Total objects presented in Parpola pictorial corpuses and Mahadevan concordance are a statistically small population, further fragmented due to the 400 to 500 signs (including variants and ligatures of basic signs) and over 100 (including variants and pictorial ligatures yielding the so-called 'fabulous' animals categories) :

No. of inscribed objects discovered: India: 1537; Pakistan: 2138; West Asia: 17

The pictorials are as important as signs and must be 'deciphered' to understand the message conveyed by the inscription on an object.

Another clue which may be surmised: A sign by itself may constitute a message and hence may be a lexeme.

Considering that as many as 273 inscriptions are communicated using two signs or less (with or without a pictorial motif or 'field symbol'), it may not be appropriate to assign syllabic or alphabetic values to each sign or each pictorial. Each pictorial or each sign may contain a 'word' or 'lexeme'.(Unless, of course, the entire messaging system is cryptographic using 'syllabic' or 'alphabetic' codes; this we think, is unlikely considering the nature of the

cylinder seals in Mesopotamia mainly with pictorials used to convey movable property items.)



Cylinder seal, Mesopotamia (British Museum, No. 89538)

Clay relief stamped with the figure of the Babylonian hero Gilgamesh, holding a vase from which two streams of water flow. (British Museum No. 21204)





Fragment of limestone sculptured in relief with vases from which streams of water flow. (British Museum No. 95477) [Leonard W. King, 1916, *A History of Sumer and Akkad*, London, Chatto and Windus, p.73)

Engraved shell plaques, Telloh, 3rd millennium B.C. (London)[**Note the trident, spears and the lion biting into the neck of the one-horned bull; if a_ra_ (lion) is a saw, val. (bull-heifer) is a sword**].



Animals depicted on a gaming board (Mesopotamia)

Three groups of 'unicorn' seals; cf. Franke-Vogt 1992: fig. 13.3

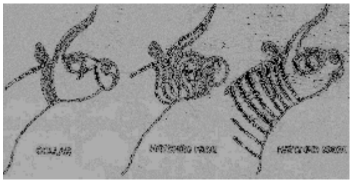
Group 1: hatched face animal (with zig-zag or straight cage on the standard) is associated with the north, around Harappa and the Sarasvati river

Group 2: (with collared necks and straight cage on the standard) is found in the south, around Mohenjodaro cf. Rissman, 1989: 168.



Decorations on the head and neck of the 'unicorn'

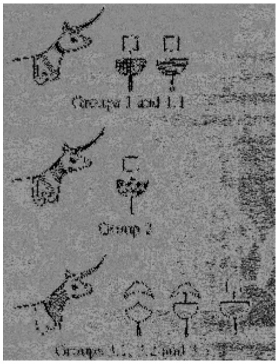
Inscribed copper tablet DK 11307 Mohenjodaro. Conjoined bovids (with 'unicorn' stripes on the face) with two 'altars' in front. Four signs on reverse. (Jansen and Urban, 1987, p. 71). [The stylised pannier on the bovids is an indicator that a 'unicorn' (ibex/urus) is depicted with two horns. The 'altars' may be 'troughs' which normally appear in front of other animal pictorials such as the bison, tiger, elephant or rhinoceros.]



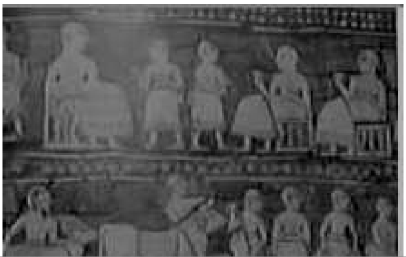


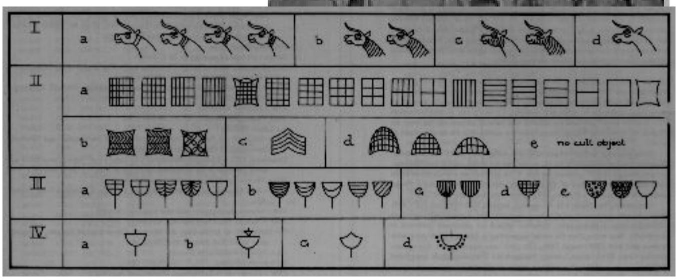


Cylinder seal; Louvre, ca. 3000 B.C



Cylinder seal; Louvre, ca. 3000 B.C. (Sumerian seal from Jemdet Nasr showing 13 'unicorns'; cf. Heras, 1953, p. 220).





Standard of Ur depicting the one-horned bull and other scenes.

Ram's body and the elephant's trunk; SD 1109; Stone statue; Mohenjodaro Museum 430 (H 25.5cm; L: 19.5 cm; B: 13 cm.)

Sind Ibex (Capra aegagru, Erxleben or Capra hircus, L.);Yellow limestone statue; U 81036; Mohenjodaro Museum (H: 16.5 cm.; L: 22 cm; B: 12.3 cm.) [loc. cit.Jansen and Urban, 1987, p.67].





Kalibangan: copper bull (ca. 2300 to 1750 B.C., Period II); Pl. XXV, Possehl, ed., 1979, *Ancient Cities of the Indus.*



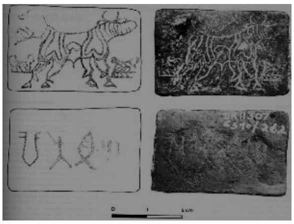


Mehrgarh; stone bull, Period I, Neolithic (5378+/- 290 and 5182+/-80 B.C.); Jarrige, Jean Francois, Towns and Villages of Hill and Plain, in Frontiers of the Indus Civilization, 1984, Fig. 33.3



Inlay of a bull; Tell El-obeid, ca. 3300 B.C.

There are ligatured pictorials on the seals and tablets of Sindhu civilization depicting a horned person with hoofs and tail.



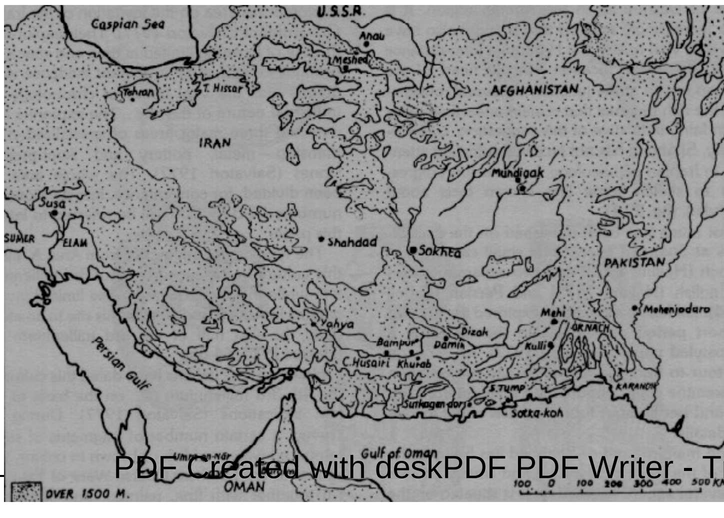
The formula in the rebus methodology

Image = Sound = Meaning

All words are semantic indicators. ***Ella_ccollum poru*l.*ku-ittanave_*** (*Tol. Col. Peya.* 1)

This suggestion is based on the following hypothesis: **semantic competence is the substratum in philogeny; grammar is only a surface layer in the neural networks.**

"It is beyond any reasonable doubt that there exist Dravidian loan-words in Indo-Aryan. A number of lists have been compiled, and probably 750 loan-words have been suggested. As Emeneau says, these are all in fact merely 'suggestions', as are, in the last analysis, all areal etymologies—unprovable 'acts of faith' (in contrast to etymologies within a linguistic family which are provable through their conformity to phonological correspondences)…The mapping, evaluating, and accepting of the traits that determine the Indian sub-continent as a linguistic area is far from finished. An early diagnosis of the situation was provided by Jules Bloch who between 1925-1934 summed up earlier suggestions to 'the effect that Indo-Aryan had undergone, from the beginning of its presence in India, an Indianization through contact with Dravidian (and probably with other language families). This view has gone through a process of demonstration that has been capped…by Kuiper in 1967' (Emeneau, 1969)…New evidence of both structural and lexical diffusion is emerging constantly." (Zvelebil, Kamil V., 1990, *Dravidian Linguistics: an Introduction*, Pondicherry Institute of Linguistics and Culture, pp. 75-82).



It is notable that the contact was intense with Mesopotamia during the mature Harappan period and some intimations of contact are noted

in the Late Harappan period with BMAC, indicating that, with the collapse of the Mesopotamian markets and the desiccation of the River Sarasvati, the bronze-age prospectors and workers started migrating away from the River Basin and were also moving towards the BMAC area in search of mineral resources required to continue to sustain the bronze-age production and trading activities, as evidenced by the finds of copper-bronze seals at Shahdad.

Shahdad: in relation to Sokhta and Mohenjodaro (After Shashi Asthana, 1984, Fig. 39.1). A copper mirror and and spear head and etched cornelian beads (an obvious link with Saurashtra, Gujarat) were discovered at this site. Four axes with animal heads, one axe showing a fish on one side of the blade and a scene depicting a fight between a lion and a bull on the other. A number of copper-bronze seals with figures in raised outline outline have also been found. Smelting furnaces have been discovered. (Hakimi, A., 19073, Prehistoric discovery in East Iran, *Illustrated London News*: 64-66).

"...contact and trade with Mesopotamia were factors contributing to the development and growth of the Indus Valley civilization, established in an area known to the Sumerians as the land of Melukkha. So close was the relationship that the traders of Dilmun used the same system of weights and measures as that found in the Indus Valley. From the figures given in Sumerian texts it would appear that the Dilmun shekel was about three times heavier than the standard Sumerian one...The amount of copper involved in this trade was quite considerable. One text from Ur (UET 5, 796), dated to the reign of Rim-Sin of Larsa (1822-1763 BC), records the receipt in Dilmun of 611 talents, 6 2/3 minas of copper(presumably from Magan). This shipment, according to the text, was weighed according to the standard of Ur, giving a modern equivalent of 18,333 kilograms (40,330 pounds) of copper. One-third of this copper was earmarked for delivery to Ea-na_s.ir of Ur, a merchant who had close connections with Magan and the Dilmun copper trade...The recovery of fine gold particles from streams, making use of the woolly fleece of sheep(the famous Golden Fleece of Greek legend), was still practised in Afghanistan well into the twentieth century... Greek geographer Strabo(first century BC) does refer to tin from Drangiana, Iranian Seistan (15.2.10), a reference that certainly could be seen within the context of an overland trade route through Shahr-i-Sokhta and Mundigak and on to Susa..." (Muhly, James D., 1995, , in: Jack M. Sasson (ed.), *Civilizations of the Ancient Near East*, Vol. I, pp. 1501-1521).

"Sumerian literary texts refer to gold from Aratta (Pettinato 1972: 79). Gudea records receiving gold from the mountain of Hah(h)um (Statue B, col. VI. 33-5; Liverani 1988), taken to lie in that part of modern Turkey near Samsat on the Upper Euphrates, and from Meluhha... Various texts refer to the almost mythical land of gold known as (H)arallu, perhaps somewhere in the Iranian hinterland (Komoroczy 1972; Groneberg 1980: 20)...Documents relevant to the Dilmun, trade in the later third and earlier second millennium BC indicate that some gold was still reaching Ur up the Gulf at this time, but whence it came, perhaps Meluhha, is not stated (Oppenheim 1954: 7; Leemans 1960: 120-1, is more cautious). The renowned resources of Egypt and Nubia (cf. Lucas 1962: 224-8) contributed most certainly in the fourteenth century BC to Mesopotamian royal gold holdings (Edzard 1960; Wilhelm 1974)...The tribes of Hama were richer in gold than those of Harran..." (Moorey, 1994, opcit, p. 220).

The closest contact areas were Mesopotamian and Harappan, though constituting distinct linguistic areas. The following types of commodities are imported by Mesopotamia from Makkan and Meluhha: metal and metal objects, precious metals, stone and stone objects (lapis lazuli), semi-precious stones, trees (sissoo-tree: mes-makanna) and wooden objects, boats, reeds, plants and plant derivatives, and animals**.**

It would appear that the lion and the bull (depicted with one horn), both may have related to the metallic weapons of war.

Reference to Dilmun occurs in the early archaic texts of Uruk III, dated to ca. 3200 BC. The context is: 'tax collector of Dilmun', Dilmun axe', 'Dilmun garments'. Magan is cited as the source of copper and denoted Oman in the third and early second millennium BC. The contexts are: 'mesu wood of Magan'. This wood is *dalbergia sissoo*. The earliest reference to Meluhha is by Sargon of Akkad (2334-2279 BC) who boasts in an inscription: "Ships from Meluhha, ships from Magan (and) ships from Dilmun he (i.e. Sargon) made lay anchor at the harbour of Akkad."



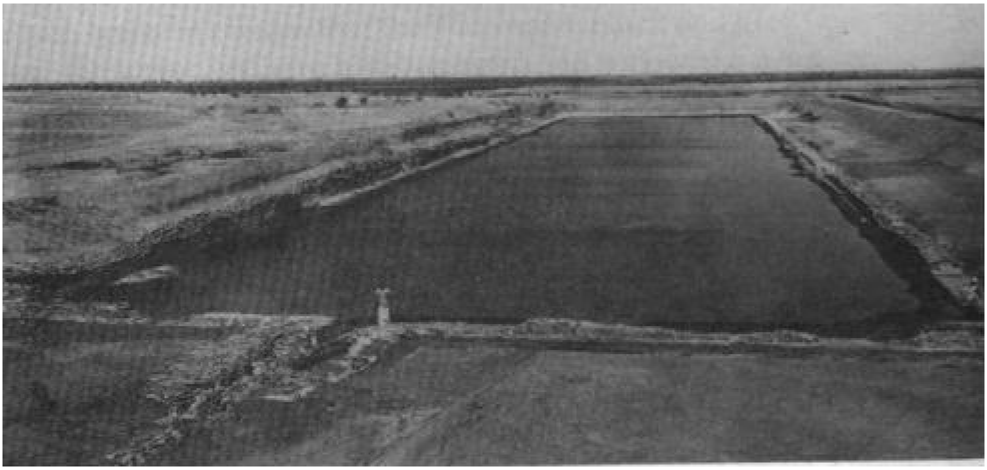
Gudea, the Sumerian king of Lagash (2144-2124 BC) notes in an inscription: "the Meluhhans came

from their country”; the supplied were: us’u_ wood, gold dust, carnelian. “The Meluhhans seem to have stayed in Lagash and established a colony there, for a village called Meluhha existed near the city for at least 35 years (2105-2071 BC) in the time of the Third Dynasty of Ur…The cuneiform text called ‘Enki and Ninhursag’ (lines 3-5) says: ‘May the land of Meluhha bring to you tempting precious carnelian, sissoo wood of Magan, fine sea-wood (and) large boats’. The meaning ‘carnelian’ for gug (= Akkadian sa_mtu, lit. ‘red stone’) is considered as certain…Ivory was also among the products of Meluhha.” (Parpola, Asko, 1994, p. 14).

Lothal: bathing pavements and drains

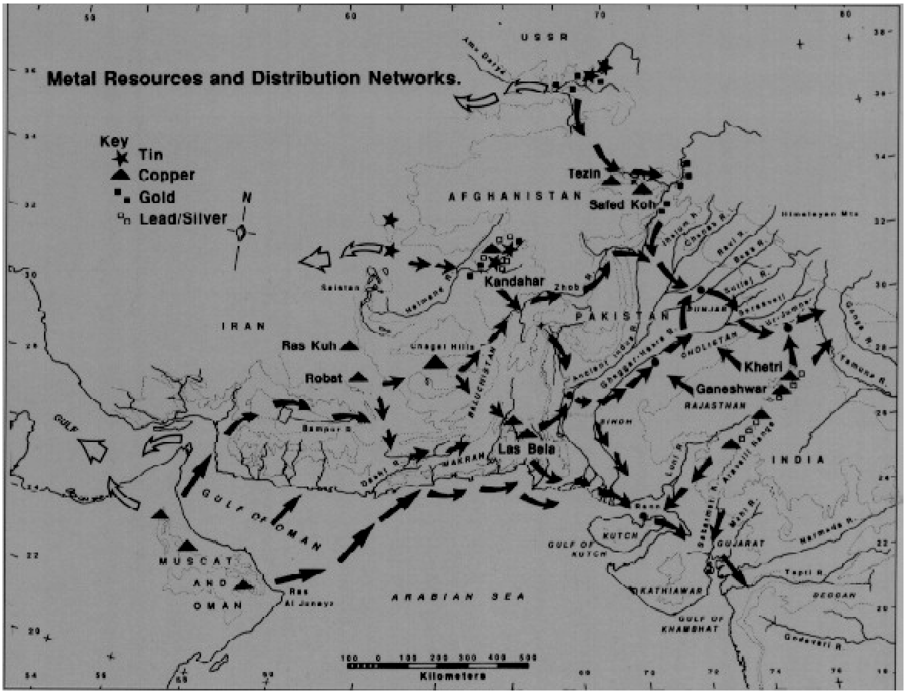
While the contact with Mesopotamia was principally through the riverine, maritime route across the Persian Gulf, there are also indications of over-land trade routes. The seals of the Sarasvati Sindhu civilization and from Susa, Tell Suliemeh, Tell Asmar and Ur mark an overland route to Mesopotamia and show species of animals typically depicted on the inscriptions of the civilization on stamp seals and tablets. Most of these cylinder seals are made of talc (steatite) which has been hardened by firing to form enstatite. (During Caspers 1970-71, 1982).

The ecosystem of these areas is different from that of the area south of these settlements. The zone south Rupar and Harappa consist of the vast plains, extending from Jhelum River to the Yamuna River. The hinterland enclosed by the mountains and the plains was a rich source of raw materials, ranging from deodar forest products to copper in Khetri mines. In contrast to this, the hinterland of Mohenjo-daro was linked to areas in Baluchistan and Afghanistan and across the Persian Gulf, in contacts with the Mesopotamian civilization. The essential link between Harappa and Mohenjodaro was provided by the riverine system of the Sindhu for transporting trade goods. If Mohenjodaro was the foreign trade capital, Harappa was the collecting point or the internal trade capital, of the hinterland of Bharat.



Lothal: dockyard

Network of mineral resource locations: tin, copper, gold, lead/silver (After J.M. Kenoyer, 1998, Fig. 5.20f). “Copper ore was probably smelted near the mining sources and brought into the Indus Valley as bun-shaped ingots. Major copper



sources are located to the west of Baluchistan, the east in Rajasthan and across the gulf in Oman. Any of these areas could have produced enough copper to supply the entire Indus Valley civilization, but the Indus merchants were trading with all these areas. One can imagine traders shouting out the benefits of Oman copper. ‘It is a bit more expensive, but more pure than the slag from Baluchistan or Rajasthan.’ A merchant from Baluchistan would shout back, ‘Omani copper is soft like the meat of a date, while the highland copper is strong and hard like the pit.’ Marine shell was also brought from three sources. The Gulf of Kutch and Saurashtra to the east produced species of shell that were used to make bangles, ladles and inlay. Similar species were obtained from the coast west of Karachi, and a third source was the Omani coast..At the coastal site of Balakot, a local species of clam shell was used.” (J.M.Kenoyer, 1998, p. 94).

प्र ते॑ ऽरद॒द् वरु॑णो॒ यात॑वे प॒थः सिन्धो॒ यद् वाजा॑ अ॒भ्य् अद्र॑व॒स् त्वम् ।

भूम्या॒ अधि॑ प्र॒वता॑ यासि॒ सानु॑ना॒ यद् ए॑षा॒म् अग्र॒ं जग॑ताम् इ॒रज्यसि॑ ॥

10.075.02 For your course, Sindhu, Varun.a tore open a path,since you hastened towards food; you go by a lofty road down upon the earth, by which (road) you reign in the sight of all worlds.

This could also be an allusion to Indra opening up the riverine channel of Sindhu as a navigable trade route for maritime and riverine trade. Sarasvati_ River had given to Divoda_sa inexhaustible profit (rabhasam r.n.acyutam: RV 6.61.1). Sarasvati_ River is va_jebhir va_jinni_vati_ (RV 6.61.4), rich in her wealth who leads the poet to glorious treasure.

आ क्षोदो॒ महि॑ वृ॒तं न॒दीना॒म् परि॑ष्ठितम् असृज ऊ॒र्मिम् अ॒पाम् ।

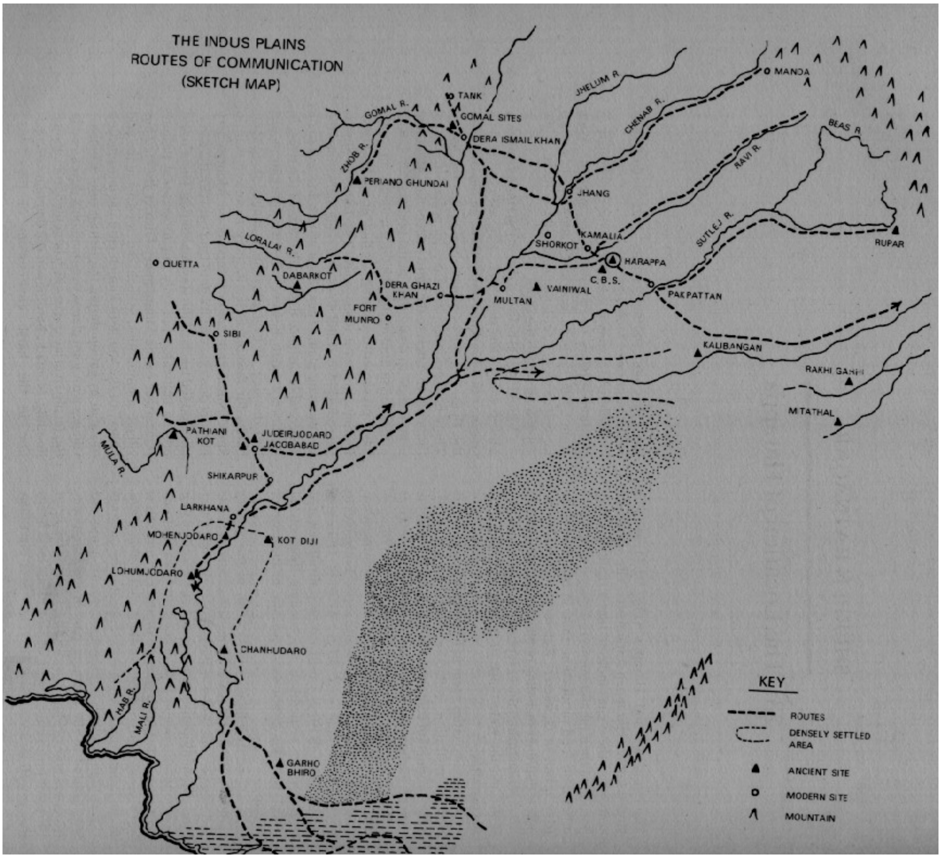
तासा॒म् अनु॑ प्र॒वत॑ इन्द्र॒ पन्था॒म् प्रार्द॑यो॒ नीचीर् अ॒पसः॑ समु॒द्रम् ॥

6.017.12 You have set free the greatly obstructed and arrested water of the rivers, the flux of the waters; you have directed them, Indra, upon their downward paths; you have sent them rapidly down to the ocean.

The principal purpose of the river was to be pantha_, the waterway, a navigable channel: va_ripatha.

“The rivers of the Indus system provide natural watersays and routes of communication from the Himalayan region to the plains. Traffic between mountains to the west and the upper plains has traditionally flowed through Dera Ismail Khan and Dera Ghazi Khan. Multan, a frontier city of the medieval period is connectged to both places by good routes; the Chenab being fordable in its vicinity. Routes move up the Ravi from Multan to Harappa, and thence some 60 km.s. southeast to Pakpattan. This has been the traditional ferrypoint on the Sutlej for centuries, and is an important stage on routes connecting the Punjab with the Sarasvati Valley. Alternately, a winter caravan route has traditionally moved from Dera Ismail Khan to Jhan, Kamalia, Harappa, Pakpattan and thence to Delhi (Gasetteer of Montgomery District 1884: 147-48, 184-85; loc. cit. Shireen Ratnagar, 1982, The Location of Harapa, in: Gregory L. Possehl, ed., *Harappan Civilization*, p. 263).

Figure 2 Harappa: collection point from the mountains and the plains (After



Ratnagar, S., 1982, Fig. 23.1). Harappa is, thus, a naturally situated apex for the collection of goods from the surrounding mountain zones and also from the plains. [Note that the map shows River Sutlej in its present-day course and not as a tributary of River Sarasvati, joining the latter at Shatrana, Punjab].

Sprachbund or 'linguistic area'

We have to exercise great caution before trying to decipher an 'ursprache' for every group of languages. To quote Franz Boas who is often referred to as the father of American Anthropology:

"Our experience in Indo-European and Semitic languages shows clearly that extended borrowing of words may occur and tha tborrowed words may undergo such changes that their origin can be understood only by historical

study...If these observations regarding the influence of acculturation upon language should be correct, then the whole history of American languages must not be treated on the assumption that all languages which show similarities must be considered as branches of the same linguistic family. We should rather find a phenomenon which is parallel to the features characteristic of other ethnological phenomena--namely, a development from diverse sources which are gradually worked into a single cultural unit. We should have to reckon with the tendency of languages to absorb so many foreign traits that we can no longer speak of a single origin, and that it would be arbitrary whether we associate a language with one or the other of the contributing stocks. In other words, the whole theory of an 'Ursprache' for every group of modern languages must be held in abeyance until we can prove that these languages go back to a single stock and that they have not originated, to a large extent, by the process of acculturation." (Franz Boas, The Classification of American Languages, in: ***American Anthropologist***, N.S., vol. 22, 1920, pp. 367-376).

Our conception of an Indian linguistic area ca. 3500 BC which explains the inscriptions of the civilization would be in conformity with this approach of assuming a development of the Indian languages from diverse sources. The same holds true for the hypothetical reconstructions of the so-called Indo-Aryan or the Indo-Iranian or Indo-European family of languages.

Sarasvati Civilization: Neolithic-Chalcolithic culture zones and sites influenced by diffusion (After Kirk, William, 1975,The role of India in the diffusion of early cultures, in: *Geographical Journal*, Vol. 141, Part I, March 1975; Fig. 1).

Sarasvati Civilization continuum: Iron age culture zones; Painted Grey Ware, megalithic complex of southern India; urban sites; limit of early Iron age by 1200 BC; western limit of black-red ware ca 800 BC. “...three episodes in the

cultural history of south Asia are examined from a geographical point of view, viz. (A) the eastward diffusion of Indus valley urban cultures ca. 1500 BC. (B) the diffusion of early Iron Age cultures in the first millennium BC. © the expansion of Gangetic civilization after ca. 500 BC. In each episode the importance of the forest frontier is noted and the function of two corridors of diffusion (the Gangetic corridor and the Deccan corridor) examined. Indian civilization is seen as a product of the interplay of desert and forest environments and south Asia as a notable area for the transformation of cultural complexes by trans-regional adaptations."(After Kirk, William, 1975,The role of India in the diffusion of early cultures, in: *Geographical Journal*, Vol. 141, Part I, March 1975; Fig. 2; pp.19-34).

Harappan culture is the consequence of a long indigenous development in the Sarasvati and Sindhu River Basins. "It should be stated at once that though the Harappan civilization itself was comparatively short-lived, its widespread settlement, its long genesis, its technological control and organization in pastoralism, agriculture, architecture, and crafts generally, makes its contribution to early subcontinental culture obviously of great importance. Furthermore, there is evidence, particularly in Gujarat and perhaps Maharashtra, of a gradual emergence of post-Harappan cultural forms that contain traits whyich owe their origin with high probabilitgy to the Harappan culture. Arguments that the Harappans spoke an unknown language appear to be denied by the evidence for the importance of their culture. Furthermore, there is no evidence that the end of the Harappan civilization was caused by a genocide and an extinction of the 'race'. There is also the now-established knowledge of widespread Harappan stations in Badakhshan, Punjab, Bahawalpur, Sind, Lothal, Kachhi, Las Bela, the Makran, Rajasthan, and Gujarat. Contacts with inner Asia were regular as were those with indigenous people within and without the Harappan regional sphere. The presence of loan words, even the possibility of bi- or trilingual situation, is very good. A degree of hybridization is natural enough given the extended world of Harappan civilization. We cannot therefore consider the Harappan language as a consequence of a homogeneous isogloss, but a viable workaday language with many influences foreign and indigenous alike." (Fairservis, Water A., 1992, *The Harappan Civilization and its Writing*, New Delhi, Oxford and IBH Publishing co. Pvt. Ltd., p.14).

Most complex settlements such as Harappa (on the Ravi river) and Kalibangan (on the Sarasvati river) had been abandoned during the early centuries of the

second millennium B.C. It would appear that the Sarasvati and her streams started drying up during the early centuries of the second millennium and had fully dried up beyond Anupgarh by the end of the era.

It is reasonable to formulate a hypothesis that (a) Sarasvati was the centre of the settlements of the civilization; (b) the gradual decline of the Harappan civilization circa 1500 B.C. and the resulting migrations southward and eastward of the Harappan peoples were principally caused by the drying up of the Sarasvati river, west-ward migratory changes in the course of the Sutlej, Beas and Ravi rivers and gradual inundation of the Rann of Kutch which was an island circa 2000 B.C. with a navigable surrounding sea. Another hypothesis which can be postulated is based on the early observations of Marshall: "…What seems prima facie more probable is that this forgotten civilization, of which the excavations of Harappa and Mohenjo-daro have now given us a first total glimpse, was developed in the Indus valley itself… there is no reason to assume that the culture of this region was imported from other lands, or that its character was primarily modified by outside influences." (Marshall, 1924: 548). The hypothesis is that the civilization was developed and nurtured in the valleys of two great rivers: the Sindhu and Sarasvati rivers. This modified the hypothesis postulated by Amalanda Ghosh in 1964: a homogenous pre-Harappan culture in Gujarat, Rajasthan, Sind, Punjab and Baluchistan, named the Sothi culture after the name of the site in the Drishadvati basin with Kalibangan I pre-Harappan pottery. Ghosh also sees Sothi-type ware in the deep levels of Mohenjo-daro and in sites like Kalibangan and Rupar. (Ghosh, 1965). ["Drishadvati means the 'rocky' or 'stoney' and the Sarsuti is described by Utli in the time of Mahmud Ghaznis invasion as having a bottom full of large stones, with precipitous banks and impetuous stream". (A.Cunningham, *Archaeological Survey of India,* Vol. XIV, India, 1887, p. 88)]. On the indigenous development of the civilization in pre-Harappan times, the following observation of Mughal is noteworthy: "We already have the evidence of fairly large towns along the river valleys, fortifications, knowledge of stone and metal technology reflecting specialized craftsmanship, wheeled means of transport, trade of lapis lazuli with outside regions and an emerging system of writing. Only two elements of urbanized society are lacking: (i) large cities like Mohenjo-daro, Harappa and Kalibangan, and (ii) increased specialization to engage in full time crafts like seal-engraving, sculpture, modelling and metallurgy, which in turn were related to increased access to raw material or means of obtaining them and availability of resources to support craftsmen not directly involved in subsistence activities… The Mature

Harappan culture, therefore, was the ultimate result of these processes.” (Mughal, R.M., 1973).

The Harappan civilization faded into the Indian cultural milieu as part of a continuum. The language of the Harappans would include Indo-Aryan lexemes, since it is archaeologically demonstrable that the civilization had continuing contacts with Inner Asia.

Close contact with peoples speaking a neighbouring languages results in the acquisition of certain features of that language and vice versa; this results in a 'linguistic area' (sprachbund).

"We have evidence for at least half a dozen Indo-European languages in Anatolia and northern Syria during the second and first millennia BCE. Except for Phrygian, all of these share a number of features pointing to a period of common pre-historic development that we may call Common Anatolian. One may therefore speak of an Anatolian subgroup of Indo-European languages comparable to Germanic, Slavic, or Celtic. To this group belong Hittite, Palaic, Luwian, Lycian, and Lydian. It is now virtually certain that we should add Carian, Pisidian, and Sidetic... It is important to bear in mind that the Anatolian family as just defined is primarily a linguistic concept. The existence of such a subgroup of Indo-European languages is entirely independent of any theories about migration or diffusion of population groups. The speech community associated with the reconstructed prehistoric Common Anatolian stage may or may not have lived on the soil of Anatolia."

(H. Craig Melchert, 1995, *Indo-European Languages of Anatolia*, in:Jack M. Sasson (ed.), ***Civilizations of the Ancient Near East***, Vol. III, pp. 2151-2159).

Possehl notes: “We know that by the end of the second millennium BC, the settlement pattern in this area (Cholistan where M.R. Mughal found hundreds of mature Harappan sites) had been radically altered and villages were by then established within the entrenchment of the Sarasvati and other streams that are a part of this riverine system. Thus, the drying-up of these streams seems to have begun at the opening of the second millennium and to have been complete by the end of the same era. Shorter term, violent tectonic events are also postulated at Harappan sites (e.g. Kalibangan and Banawali) and they may have played a role in seriously disrupting Harappan life at these places.”

Central Haryana	2 / 2 (1.1%)	115 (63.1%)	98 (82.1%) /78 (40.7%)

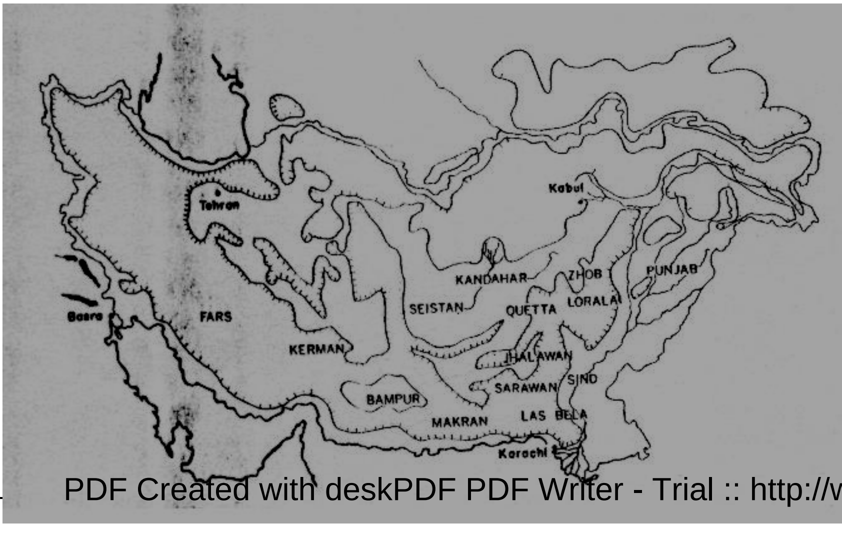
(Gregory L. Possehl, Archaeological Terminology and the Harappan Civilization, in: B.B.Lal and S.P. Gupta, eds., *Frontiers of the Indus Civilization*, Delhi, Books and Books, 1984, pp. 27-36).

Cultural change or cultural discontinuities need not be explained only in linear terms or in terms of migrations or stimulus diffusion.

"The modern archaeological record for South Asia indicates a cultural history of continuity rather than the earlier eighteenth through twentieth century scholarly interpretations of discontinuity and South Asian dependence upon Western influences...Outside influences did affect South Asian cultural development in later historic periods, but an identifiable cultural tradition has continued, an Indo-Gangetic Tradition (Shaffer, J.G., 1993, Reurbanization: the eastern Punjab and beyond. In: **Urban Form and Meaning in South Asia: The Shaping of Cities from Prehistoric to Precolonial Times**, ed. by Howard Spodek and Doris M. Srinivasan, 53-67. Washington DC, National Gallery of Art); Shaffer, J.G. and Lichtenstein, Diane A., 1995, The concepts of 'cultural tradition' and 'palaeoethnicity' in South Asian archaeology. In, **The Indo-Aryans of Ancient South Asia: Language, Material Culture and Ethnicity**, ed. by G. Erdosy, 126-154. Berlin: Walter de Gruyter) linking diverse social entities which span a time period from the development of food production in the seventh millennium BC to the present. That the archaeological record and ancient oral and literate traditions of South Asia are now converging has significant implications for regional cultural history...Within the context of cultural continuity described here, an archaeologically significant indigenous discontinuity occurs due to ecological factors. This cultural discontinuity was a regional population shift from the Indus Valley, in the west, to locations east and southeast, a phenomenon also recorded in ancient oral traditions...
Number of occupations (Percentage of sites which change in occupational status)

Cholistan	47/37 (39.8%)	26 (54.2%)	14 (20.9%)

"The linguistic designation of a category of 'Indo-European/Aryan' languages is not the question here. However, the prevailing historical explanation for it is **THE** issue. For two centuries scholars have promoted a hypothesis of 'Indo-European/Aryan' migration or invasion to explain this language category...Indeed the academic investment in this hypothesis is so great that the distinguished scholar Colin Renfrew (Renfrew, Colin, 1987, **Archaeology and Language: The Puzzle of Indo-European Origins**. New York: Cambridge University Press) opts to distort the archaeological record rather than to challenge it. Failing to identify archaeological evidence for such a migration in the European post-Neolithic periods, Renfrew argues instead for an Indo-European/Aryan human migration associated with the spread of food production economies from Anatolia. In doing so he ignores critical archaeological data from Southwest Asia (Lamberg-Karlovsky, C.C., 1988, Indo-Europeans: a Near-Eastern Perspective. **Quarterly Review of Archaeology** 9:1, 8-10) and South Asia (Shaffer, J.G., 1990, A review of: Language and Archaeology: the Puzzle of Indo-European Origins, by Colin Renfrew. **Ethnohistory** 37: 354-356). The South Asian archaeological record reviewed here does not support Renfre's position or any version of the migration/invation hypothesis. Rather, the physical distribution of sites and artifacts, stratigraphic data, radiometric dates, and geological data can account for the Vedic oral tradition describing an internal cultural discontinuity of indigenous population movement." (Shaffer, Jim G. and Diane A. Lichtenstein, Migration, Philology and South Asian Archaeology, in: Bronkhorst, J. and M. Deshpande (eds.), ***Aryan and Non-Aryan in South Asia: Evidence, Interpretation and Ideology***, Ann Arbor, University of Michigan, 1988 (in press). There are two theories about the



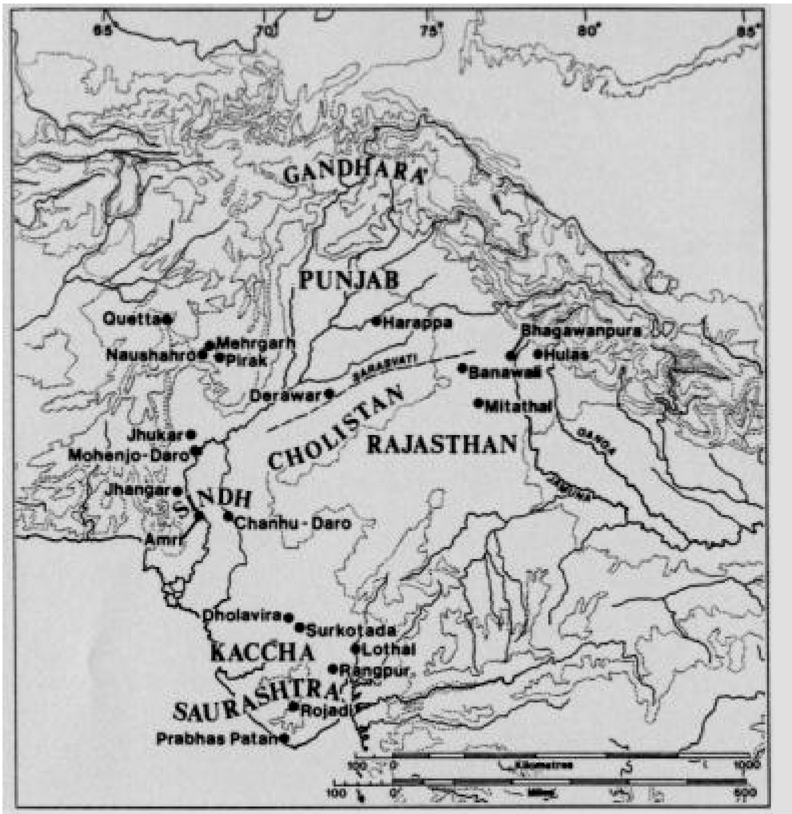
development of food production and domestication: one theory holds that the diffusion took place from the Near East about 8000 to 9000 BC and another theory holds that the development in South Asia was autochthonous. "…the theory of diffusion of Neolithicism from the Fertile Crescent to various parts of the world stands completely discredited and has been replaced by the theory of independent origins at various places…" (Gupta, S.P., and Kesarwani, A., 1983, Herding as the backdrop to the growth of agriculture in West Asia and South Asia. *Puratattva*, 12: 101-11).

India and western borderlands in the Iranian plateau Artifacts of Period IV at Mundigak (after Casal); 1-14, 16: Pottery and figurines of clay; 15: Bronze pin





Bactria; metal pins; fig 2.10 is a pin with a head in the shape of two sitting rams; this resembles a pin was found in Mohenjodaro with a head in the form of seated goats with helically bent horns (Mackay 1937: pl. C3). Pins with zoomorphic heads is typically noticed in southwest Iran and the Near East. Fig. 2.11-12 show pins with heads in the shape of clenched fist with parallels of similar pins in Mesopotamian royal tombs of Ur (Maxwell-Hyslop 1971: 13, fig.11). Good examples of Iranian-Afghan-Indian ties.



Map of principal sites of the post-urban period, first millennium BC (After F.R.Allchin, ***The Archaeology of Early Historic South Asia***, 1995, p. 27).

The Kandahar area: Mundigak. Kandahar (Ga_ndha_ra) is located at the foot of Koh-i-Baba ranges where the Argandab River debouches from the mountains. The Argandab joins the Helmand River near Kala Bist and Lashkari Bazaar, Mahmud of Ghazni's old winter capital. To the north of Kandahar is a valley above the valley of the Argandab River. It is called Kishk-i-Nakhod and in this valley was discovered the site of Mundigak. Period IV suggest the presence of temples, palaces and other large public structures. The evidence points to the influence of India.

"What is probably important in terms of understanding the cultural development of the post-urban phase is that throughout every province of the Indus civilization societies survived which, while losing some of the distinctive characteristics of the urban settlements, nonetheless retained a broadly 'Harappan' tradition in other respects. In this way the Indus system differentiates itself from some of the neighbouring areas, such as the northwest frontier region, where during the second millennium societies flourished (i.e. that represented by the Gandhara grave complex) which can scarcely if at all be said to have shared in this distinctive legacy...by the early 2nd millennium

BC...Large centres, such as Mohenjo-daro and Harappa, suffer a 90 per cent reduction in size; others such as Ganweriwala and Rakhigarhi disappear altogether., in the upper Sarasvati basin the top three levels of the settlement hierarchy are obliterated, as shown by the sizes of Late Harappan settlements (Bhan and Shaffer 1978; Kumar 1987), none of which exceeds 6 hectares. In the lower Sarasvati (Hakra) valley the change appears to be more gradual, with the retention of a three-tiered hierarchy crowned by a site of 38 hectares (Kudwala) and showing a cluster of sites between 12 and 20 hectares...Finally, there occurs a significant population shift towards the northeast, most likely in response to the gradual drying up of the Sarasvati river system in the wake of tectonic action (Yash Pal et al. 1984). This is graphically illustrated within the lower Sarasvati (Hakra) valley (Mughal 1984), as well as by the disappearance of sites in northern Rajasthan and the correspondingly dramatic increase in the number of sites in the eastern Punjab and haryana (from 34 to 128, and from 44 to 297) (Joshi et al. 1984)...

"Coupled with the undeniable fact that a_ryas speak a language with striking structural similarities to languages outside South Asia, the following conclusions seem inescapable: (1) While Indo-European languages may well have spread to South Asia through migration, the a_ryas were not their carriers. (2) A_ryas do not constitute a racial group; rather, belonging to diverse ethnic groups, they are distinguished by a set of ideas and it is these--instead of the people holding them -- which spread rapidly over the subcontinent...the Kurus are placed in the upper Ganga_-Yamuna_ Doab, while their Rigvedic ancestors (the Pu_rus and the Bharatas) had lived between the Sarasvati and Ravi (RV III.23, III.33, VI.61, VII.18 and VII.96). However, such a localized shift would be expected in light of the drying up of the Sarasvati and is clearly reflected in settlement patterns...Hastinapura and Atranjikhera...conventionalized swastikas are found at both sites in considerable numbers." (Allchin, 1995, opcit, p. 30-95).

Proto-Indic

The earliest evidence for an Indic language is found not in India but in the Tigris-Euphrates doab, ca. 1600 BC. (Of course, the Harappan script

decipherment will push the evidence of written indic words to ca. 3500 BC). Here was the empire of Mitanni, extending from the shores of the Mediterranean to the Zagros mountains, in conflict with the Hittites in the west and with the Egyptians in the southwest for the control of the Euphrates river. The language of Mitanni was Hurrian; there is, however, a clear evidence of the use of Indic vocabulary in the Mitanni documents.

ila_ni Mi-it-ra as'-s'i-il ila_ni U-ru wa.na-as's'i-el (in another text A.ru-na-as'.s'i-il) in.dar (other text: In-da.ra) ila_ni na-s'a-at-ti-ya-an-na (cf. Winckler, Mitteilungen der Deutschen Orient-Gesellschaft No. 35, 1907, p. 51, s. Boghazkoi-Studien VIII, Leipzig 1923, pp. 32 f., 54 f.)

All the four treaty gods are mentioned in one hymn of the R.gveda (RV. 10.125.1).

P. Thieme demonstrated that the gods of the Mitanni treaties are specifically Vedic gods, and that they cannot be Proto-Aryan. Macdonnel is more emphatic: "It is a fact, however, that this particular grouping of the gods Varun.a and Mitra, Indra and Na_satyau, with these forms of their names, can be traced **only in the Veda**. For this reason I agree with Jacobi, Konow and Hillebrandt in considering these gods to be **Indian, Vedic** deities and that there is no possible justification for any other view. We shall have to assume that, just as there were Aryan immigrations into India from the west, there must have been isolated migrations back to the west." (Macdonnel, opcit, 1927, p. 805).

The Mitanni Evidence

1. From Paul Thieme, 'The "Aryan" Gods of the Mitanni Treaties', ***JAOS***, Vol. 80, 1960, pp. 301-317.

"...Kikkuli's treatise in Hittite on horse training (numerals: aika-one, tera - three,panza -- five, satta -- seven, na(ua) -- nine; appellatives: uartana -- circuitm course (in which horses move when being trained), as'ua-- horse, and, finally, a series of names of Aryan divinities on a Mitanni-Hatti and a Hatti-Mitanni treaty (14th century BC)... a key question is whether these data should be interpreted as traces of specifically Indo-Aryan speech and religion, or whether they should rather be identified as Proto-Aryan... an answer to it

would have considerable historical implications. The historian will devise a theory to explain how 'Indians', or 'Proto-Indians', or 'Para-Indians', or 'Proto-Aryans' could come into Western Asia and exercise influence inferable from these linguistic traces. The linguist is entitled to be more modest. At the first step, he will not attempt to offer an explication in terms of a hypothesis, but to reach a factual decision on the linguistic character of the terms that confront him... It is easy to see that in each case where there exists a clearly recognizable difference between Indo-Aryan and Iranian, the terms and names of the Akkadian and Hittite documentation (as far as they are safely identifiable) side with Indo-Aryan-- s in intervocalic or prevocalic initial positions, which in Iranian appears as h, is preserve: nas'aattiia- (Mitanni treaty); Sanskrit Na_satya, but Iranian *Na_ha0ya (Av. Na_nhai0ya); satta-(Kikkuli): Sanskrit sapta, but Iranian hafta, hapta; the numeral 'one' is aika-(Kikkuli): Sanskrit eka, but Iranian aiva. However, it is not possible to deny that the forms Na_satya, sapta and a numeral aika might be Proto-Aryan. As far as s is concerned, Indo-Aryan preserves the old situation while Iranian has innovated; as to aika, the possibility must be admitted that both *aika and *aiva were Proto-Aryan and that the exclusive adoption of *aika in Indo-Aryan and of aiva in Iranian is the result of a later development. The fact that Proto-Aryan *ai and *au are replaced in Indo-Aryan by e and o, while in old Iranian they are preserved as ai and au and that ai and au regularly appear on the Anatolian documents (e.g., Kikkuli's aika), is unfortunately inconclusive... In his essay, 'The Aryan Gods of the Mitani People (Kristinania Etnografiske Museums Skrifter Bind 3 Hefte 1; Kristiania, 1921), Sten Konow vigorously maintained that a clear-cut difference between Proto-Aryan and Indo-Aryan divine nomenclature necessarily has to be asumed, and that by taking into account this difference it becomes possible to settle the Indo-Aryan (Vedic) nature of the gods named as witnesses on the treaties. Sten Konow's arguments have been unduly neglected by several contemporary scholars. It is, for instance, hard to accept T. Burrow's statement (Sanskrit Language, p. 30): "It is only the antiquity and conservativism of the Indian tradition, as opposed to the Iranian, that has led scholars to regard these Aryas (in the Mitanni realm) as specifically Indo-Aryan." One of Konow's chief points was that the Vedic Indra must be distinguished from a presumable Proto-Aryan *Indra and that the particular role he plays in the RV alone can be held responsible for his appearing in the Mitanni treaty in the company of Mitra and Varun.a. Nor do I find it possible to concur with Mayrhofer's charecterization of the relation of Vedic and Iranian to Proto-Aryan religion (Die Sprache, Vol. V, p. 90: "Bei den Gutternamen (war)... was uns nur im Veda in voller Blute erscheint, doch

mit Sicherbeit (sic!) bereits im Gemeinarischen, aber ebenso wohl im vorzarathustrischen Iranischen vorhanden..."), whiich while being in full harmony with views held and expressed by H. Oldenbern in his time (cf., e.g., JRAS 1909, pp. 1096-1098), cannot be derived wth any cogency from our actual data, and rather rests on highly questionable simplifications....To be correct, Burrow's verdict might well have to be inverted: It is only the unquestioning acceptance of the conservativism of the Indian tradition, as opposed to the Iranian, that has led some scholars to regard the Aryan gods of the Mitanni treaty to be Proto-Aryan....

"The lists of the Aryan gods on the Hatti-Mitanni (KBo I 1 and duplicates) and the Mitanni-Hatti (KBo I 3) treaties read:...

mi-it-ra-as'-si-il...
in-dar
na-s'a-a (t-ti-ia-a)n-na...
mi-it-ra-as'-s'i-il
a-ru-na-as'-s'i-il
in-da-ra
na-s'a-at-ti-ia-an-na

It cannot be doubted, and indeed never was, that the onomastic elements of these texts, which are given in italics in my transcription, have exact equivalents in Vedic religious poetry. Here the stem forms of the names quoted would read: Mitra-, Varun.a-, Indra-, Na_satya-... If further asked to name a Rigvedic verse in which these names appear side by side and in this orde,r he would have to quote RV 10.125.1bc:

aham mitra_-varun.a_ ubha_ bibharmi
aham indra_gni_ aham as'vina_ ubha_

"I (Speech) carry (support, nourish, or bear-- in my womb) both Mitra and Varun.a, I (carry) Indra- Agni, I (carry) both the two As'vins"...It is the merit of G. Dumezil (Les dieux des Indo-Europeens, Paris 1952, p. 9ff.) to have pointed out the analogy of the Mitanni series and that of RV 10.125.1bc...There is no justification for obliterating this potential clue by choosing to quote the gods of the Mitanni treaties in an arbitrarily changed order (Burrow, opcit, p. 28)... The name Varun.a is spelt in two different ways... u-ru-ua-na; a-ru-na... it represents an actual variant of the name, introduced by a Hittite who connected

with Hittite aruna- 'sea'. Varun.a is, in fact, closely associated with the waters, especially the 'sea' (samudra), in the RV... the compound mitra_varun.a_ was divided incorrectly, not into the two duals mitra_ and varun.a_, but into the duals *mitra_u and *arun.a_...

"...the obvious presumption is that the Aryan gods in the list are gods of the royal family-- and perhaps of part of the nobility-- while the Mitanni gods are those of the 'Hurri people

"...Do Mitra, Varun.a, Indra and the two Na_satyas protect treaties in the RV? and: Is it likely or provable that they did so in Proto-Aryan times? To the first question a strictly factual answer can be given: all the named gods indeed are said to protect treaties in the RV, even the two Na_satyas, though these only ocasionally. The second one cannot be answered with the same confidence, since we have no primary sources of Proto-Aryan religion and must rely upon the resources of techniques of reconstruction... A reconstruction (of Proto-Aryan religion) can be attempted only by a careful confrontation of Vedic and Avestan terminology. Such confrontation yields the result that but one name in the Mitanni list can be postulated safely as that of a Proto-Aryan god whose function it was to protect treaties-- *Mitra m. 'Contract, Treaty'. All the other items of the list are doubtful with respect either to the form of the name or to the functions of the god in Proto-Aryan times."

Suniti Kumar Chatterji notes that the Latvian writer, Fr. Malbergis, wrote in 1856 that the Latvians like the Russians and Germans came from the banks of the Ganga. The Latvian tradition is that a wise people, Burtnieks brought all science and knowledge to Latvia from India. The tradition further holds that Videvuds was a teacher of this profound wisdom. The Vaidilutes, the old Lithuanian priestesses tended the sacred fire as part of the Old Indo-European Balt religious rite and a modern Lithuanian poet suggested that this fire arrived in Lithuania from the banks of Ind. (Chatterji, S.K., 1968, *Balts and Aryans in their Indo-European Background,* Simla, pp. 23-24).

References to Varun.a and Mitra in a treaty can be related to interpretations of Varun.a and Mitra as personifications of True-Speech and of Contract. Using Avestic evidence, Meillet (J As., juillet-aout 1907, 143 ff.) established the original nature of God Mitra/Mithra as the personified Contract/Treaty. Vedic mitradruh means 'belying the treaty (the contractual word). Mithra as the god

of the contract is also noted in a Middle Iranian source, the Sogdian version of the Vessantara Ja_taka....RV.IX.90.5 is read thus:

matsi soma varun.am matsi mitram matsi_ndram

"Oh Soma, exhilarate (God) True-Speech (Varun.a), exhilarate (God) Contract (Mitra), exhilarate Indra...(and thereby make them fit to exercise their functions). (Paul Thieme, Remarks on the Avestan Hymn to Mithra, in: ***BSOAS***, Vol. XXIII, Part 2, 1960, pp. 265-274).

Pura_n.as refer to the migration of Druhyus to the Mleccha countries. In Pali, milekkha means copper.

In the treaty between the Hittites and Mitanni, the Mitanni king swears by: Mi-it-ra (Indic Mitra), Aru-na (Varun.a), In-da-ra (Indra) and Na-sa-at-tiya (Nasatya or As'wins). One of the Mitanni kings was named Tu(i)s'(e)ratta; this corresponds to the Vedic: tves.a-ratha, having an impetuous chariot (RV 5.61.13):

युवा स मारुतो गणस् त्वेषरथो अनेद्यः ।
शुभंयावाप्रतिष्कुतः ॥

5.061.13 That company of Maruts, ever young, riding in bright chariots, irreproachable, auspicious, motive, unobstructed.

From an archaeological perspective, the ceramics found in the Sarasvati-Sindhu doab and also in the areas of the so-called Painted Grey Ware do not have any EXTERNAL parallels and all the cumulative evidence points to an indigenous evolution of pottery types. Archaeology, does not , therefore, support a theory of an invading culture. It should also be noted that the archaeological evidence of the settlement patterns seems to indicate a gradual migration away from the Sarasvati-Sindhu doab towards the Ganga-Yamuna doab and south towards the Gujarat.

"...the entire Indo-Aryan realm (except for Sinhalese) constitutes one enormous dialectical continuum...The speech of each village differs slightly from the next, without loss of mutual intelligibility, all the way from Assam to Afghanistan....Mitanni kingdom...Indo-Iranians appear in northern Syria a full

half millennium becore their appearance in western Iran. How did they get there?...To call these Mitanni kings 'Indo-Iranians', however, is to beg an important question...Some have held that these linguistic fragments are specifically Indo-Aryan. Others including Burrow (1955) held they represent undifferentiated Indo-Iranian, before the split between Iranian and Indo-Aryan...An Indo-Aryan identification would demand an earlier dating of the Iranian/Indo-Aryan split; with it have also been associated speculations regarding the route taken by the Aryans to India (e.g., the Asia Minor route...), or, possibly a back migration of Aryans from India. (If the latter, the date of the Aryan settlement of India would have to be moved back far enough to allow not only for them to reach Syria by 1500 BC, but also for their language to have died out by then, leaving only the terminological residue noted...)...the philological evidence alone does not allow an Indian origin of the Aryans...there is the matter of the nature of the common vocabulary shared by Sanskrit with the rest of Indo-European, which points to a more northerly ultimate home...The native Dravidian vocabulary has not been reconstructed. Burrow and Emeneau's ***Dravidian Etymological Dictionary*** (1960) only assembles materials for it... The civilization seems to have continued peacefully in Gujarat until a comparatively late period, i.e. 800 BC (Fairservis 1975: 307), after which it dissolved into the subsequent culture, which makes that area one of prime importance in detecting any Harappan influence on Aryan language and culture." (Colin P. Masica, ***The Indo-Aryan Languages***, Cambridge, Cambridge University Press, 1991).

The epigraphical evidence from Mitanni-Hurrian-Subarean area in Mesopotamia, show definite use of the Sanskrit language in toponymy, in references to Vedic deities and in the training of horses. Strict adherance to the assumed Indo-European migrations alone, to a period ante-dating the Sarasvati-Sindhu civilization (ca. 9000 to 3000 BP) or the assumed contemporaneity of the Avestan or a hypothetical proto-Aryan linguistic area (which had its locus in eastern Iran, in late 1st millennium BC) cannot explain this evidence. A simple explanation (without any special pleading) is that some Sanskrit-speaking, sea-faring peoples from India had migrated to the Tigris-Euphrates doab crossing the Persian Gulf and had moved upstream of the Euphrates river, in the course of their trade contacts, principally to trade in metallic ores, metals and weapons.

On the aspects of cultural unity, Possehl notes (1999, p. 157): “From the archaeological record one senses that in spite of this differentiation, we are still seeing a single ancient culture at some level of abstraction. How were the norms of this culture maintained over such immense distances? What kept it all together? The answer to these questions is obviously ‘communication’, either direct, face to face contact, or a more indirect form. Without some convention of communication, areas that are geographically removed from one another tend to take their own course of cultural change and gradual differences will emerge. The two most obvious mechanisms that can be documented that would have sustained the mid-range and longer communication networks are the movements of pastoral nomads, and other itinerants, some of which are tied to seasonal changes, and the internal commerce of the Indus Age.”

The maldhari (cattle-keeper or cattle-breeder) are the pastoral nomads of ancient India. (Westpahl-Hellbusch, Sigrid and Heiz Westphal, 1968, *Zur Geschichte un Kultur der Jat*, Berlin, Duncker and Humblot). Many of the jats, charans, bhavards and rabaris in Kutch, Gujarat are also pastoral nomads engaged in herding and management of grazing animals. (Westphal-Hellbusch, Sigrid, 1975, Changes in the meaning of ethnic names as exemplified by the Jat, Rabari, Bhavard and Charan in Northwestern India. In. L.S. Leshink and G.D. Sontheimer, eds., *Pastoralists and Nomads in South Asia*. Wiesbaden: Otto Harrassowitz: 117-38).

Cattle were perhaps a form of wealth for the people of the civilization and must have beeen a source of great prestige. (Fairservis, Walter A.,1986, Cattle and the Harappan Chiefdoms of the Indus Valley. *Expedition*, 28(2): 58-66; 1992, *The Harappan Civilization and its Writing: A model for the decipherment of the Indus Script*. Delhi: Oxford and IBH: 133-39). The importance of the cattle to the people of the civilization is seen from the faunal assemblage. By the end of Mehrgarh Period IB, for example, cattle bones make up more than one-half of the total faunal assemblage. (Meadow, Richard, 1993, Animal domestication in the Middle East: a revised view from the eastern margin. In, Gregory L. Possehl, ex., *Harappan Civilization: A recent perspective*, 2nd edn. Delhi: Oxford and IBH and the American Institute of Indian Studies: 312-3).

The *maldharis* were the ancestors of the Rajput and Kathi and were also in Gujarat controlling vast herds of cattle and other animals. As noted in the Baluchistan Provincial Gazetteer during the early part of the 20th century, “Nearly all the highland population of the country takes part in periodic

migration—towards the plains in the autumn and toward the highlands in the spring”. (Govt. of India, 1908, *Imperial Gazetteer of India: Provincial Series, Baluchistan*, Calcutta, Superintendent of Govt. Printing: 24).The cognate etyma are: mal = fertility, richness (Ta.); malka = to abound (Ma.); malla = great, large, big, chief (Te.); malampia = proud (Pkt.)(DEDR 4729); ma.r. in: mo.f ma.r. deer and other jungle animals (To.); ma.r. senseless beast (cattle, buffalo, then applied to man)(Ko.); ma_t.u ox (Ta.Ma.)(DEDR 4798). Tamil expands the semantics: tiruma_l = god (Vis.n.u). Brahuis are nomads and almost all of them move to the plains during the winter passing through the Bolan Pass of the Kirthar Mountains. “The migration commences at the end of October and almost all the people have moved down by the end of November after sowing the spring crop, returning again to the highlands in March, when pasture is abundant and the crops are coming up.” (Minchin, 1907, *Sarawan District*, Bombay: Govt. of India. Baluchistan District Gazetteer Series, Vol. 6 (bound with Kachhi District, Vol. 6A and Jhalawan District, Vol. 6B): 45-6). It is unclear if Brahui was a purely Dravidian tongue (McAlpin, David W., 1980, Is Brahui really Dravidian? Proceedings of the Berkeley Linguistic Society, 6: 66-72). One view is that Brahui is a remnant group as Dravidians retreated south. (Bray, Denys DeS., 1909-34, *The Brahui Language*, 3 vols., Calcutta, Superintendent of Government Printing: Vol. 2, 42), Another view is that Brahuis are recent migrants from Central India. (Bloch, Jules, 1924; Sanskrit et Dravidien, *Bulletin de la Societe de Linguistique de Paris*, 25: 1-21; Elfenbein, 1983, *The Brahui problem again. Indo-Iranian Journal*, 25: 103-25; 1987, A periplous of the ‘Brahui problem’, *Studia Iranica*, 16: 215-33). Elfenbein (1987) suggests that people migrated from the vicinity of the Narmada River, through Gujarat and Sindh to Kalat about 1000 years ago.

Hurrian

In Mundarica, hor means a 'man'. In Tamil, kor-r-am means 'victory, power, sovereignty'.

"The major Semitic languages, other than Akkadian, derive their usual word for 'free' from the root |h.rr. Vullers, in his article 'Uber die Rassenfarben in der arabischen Literatur' (*Centenario della nascita di Michele Amari I*, Palermo, 1910, 84-95), connected this with |h.rr, 'hot, buring', and with |h.wr, 'white'. The underlying concept, Vullers argued, has to do with fire and light...Vullers imagined the ancient history of the Near East to have been similar to that of India where the (presumably) dark-skinned original population was subjugated

by Aryan invaders from the North. There is, however, no evidence for such a state of affairs in the lands inhabited by Semitic speaking peoples. Nonetheless, and despite the blatant racism underlying Vuller's whole line of argumentation, one cannot rule out some sort of semantic connection between the concepts 'white/bright/light' and 'free/noble'... The other occurrences of |h.rr in Achaemenian Aramaic are the h.ry yhwdy (or yhwd), the 'freemen/nobles of the Jews/Judaea', in two documents from Elephantine (A. Cowley, **Aramaic papyri of the fifth century BC**, Oxford, 1923, no. 30: 19, 31:18)...Persian wuzurga_n ud a_za_da_n, 'magnates and nobles', corresponds to Syriac rawrba_ne_ w-h.e_re_, but h.e_re_, 'nobles' occurs by itself in entirely non-Persian contexts, see for example the bnay h.e_re_ of Nagra_n (South Arabia) who are mentioned repeatedly in the Book of the Himyarites. (A. Moberg, ***The book of the Himyarites***, Lund, 1924). Hebrew h.o_ri_m occurs 13 times in the Old Testament...In all of these instances the English Authorised Bible has 'nobles' and in most cases we clearly have to do with dignitaries of some sort (e.g. the 'nobles and rulers', ha-h.o_ri_m we-ham-mega_ni_m, in Neh. 2,4,4,5,7)...For Arabic h.urr the dictionaries give (1) 'free'; (2) 'liberal, generous, frank, etc.'; (3) 'noble'.. Ancient South Arabian has h.r, plural, 'h.rr, feminine plural, 'h.rrt, 'freeman/woman'...then the special development represented by Geez h.ar(r)a_wi_, 'soldier', and h.ar(r)a_, 'troops', which do not seem to have left any traces in the modern Ethiopic languages." (Francois de Blois, 'Freemen' and 'Nobles' in Iranian and Semitic Languages, ***JRAS***, 1985, No. 1).

Zoroastrian rituals and the texts of Avesta have remarkable concordances with the R.gveda and the rituals which evolved in the Bra_hman.as.

A review of the contents of these texts will help evaluate ancient relative chronology of the Vedic age.

While the R.gveda is focussed on the processing of Soma in the context of acquisition of wealth, the ritual aspects seem to be dominant in Avestan and in the Bra_hman.as (perhaps due to the non-availability of raw materials for processing Soma and the disruption of riverine/maritime trade due to desiccation of the Sarasvati River), indicating that the practices of Avestan and Bra_hman.as are of a later date.

Enumerating gods and goddesses in treaties

"There was a tendency to enumerate a maximum of gods and goddesses able to safeguard the implementation of oaths...An interesting example is the list of deities in the treaty between Suppiluliumas, king of the Hittites, and S'attiwazza, king of Mitanni: from the Hittite side the gods of the empire are invoked...Most of them are Hattic but some are Indo-European (thus, along with the Hattic Sun-goddess of Arinna the Hittito-Luwian Sun-god is also mentioned), or Hurrian (thus, the Thunderer-god has been identified with the Hurrian Tes's'ob...and by the Hurrian mountain-gods 'south and north' (Nanni and Hazzi); moreover included in the list are seventeen Thunderer-gods, differentiated either according to the sphere of life which each of them patronizes or according to their places of worship...From the Mitannian side the deities are divided into three groups: (a) the gods of Kizzuwadna, (b) the gods, presumably of Harra_n (anyway, Semitic gods), (c) Mitanian gods proper...Group (c) includes also a mention of certain Indo-Iranian gods (probably protectors of the dynasty): there is a Hurrian sentence wedged into the Akkadian text: 'the Mithraic gods, the Varunian (?!) gods (the original has 'Urwanian (or 'Arunian') gods'; Urwana- and Aruna- are hard to explain from the Hurrian), Indra, the gods Na_satya'. Further, it includes a number of Akkadian gods firmly rooted in most Hurrian pantheons." (Diakonoff, I.M., Evidence on the Ethnic Division of the Hurrians, in: M.A. Morrison and D.I. Owen (Eds.), *Studies on the Civilization and Culture of Nuzi and the Hurrians*, Eisenbrauns, Winona Lake, Indiana, 1981pp. 77-89).

The oldest cuneiform spelling is Ma-i-ta-ni, used by S'uttarna I (S. Smith in *Antiquaries Journal* XIX 42); later the name is written variously as Mi-i-it-ta-a-an-ni, Mi-i-it-ta-an-ni, Mi-i-ta-a-an-(ni), Mi-i-ta-an-ni; the Egyptian form Mitn is found in inscriptions of Thutmose III (1490-1436). The state of Mitanni was populated mostly by Hurrians and was ruled by kings whose names indicate that they had Indo-Aryan origin. The nobility, marianni, were also Hurrians. Tus'ratta called himself 'the Hurrian king'. Bogazkoy documents refer to the people of Mittanni as Hurrian. In the first half of the first millennium BC, Hurrians are restricted to the area between northern Mesopotamia and Lake Van.

In the ancient Near East, the custom was to name (first-born?) children after their grandparents. This custom is also well-known in ancient India. In Tamil language, pe_ran- (lit. the one having the same name) means a grandson.

(Ignace J. Gelb, 1944, ***Hurrians and Subarians, Studies in Ancient Oriental Civilization No. 22***, Illinois, University of Chicago Press, p. 79).

Hurrians are only one among several ethno-linguistic groups present in significant numbers in Mesopotamia in early second millennium BC. In Hurrian, huradi means a soldier; in the neo-Assyrian period, a verb hara_du 'to keep watch' was perhaps derived from it. Many persons with Hurrian names are listed as having occupations: scribes, chariot-builders, leather-workers, farmers (is's'akku_), fisherman, weavers, and musicians (naru_). For over a century (c. 1350-1225 BC), Hurrians formed a notable minority within the population of Babylonia, particularly in the south central area around Nippur. (J.A. Brinkman, Hurrians in Babylonia in the Late Second Millennium BC), in: M.A. Morrison and D.I. Owen (Eds.), Studies on the Civilization and Culture of Nuzi and the Hurrians, Eisenbrauns, Winona Lake, Indiana, 1981).

Aryan names found in Mesopotamia, Syria and Palestine are attributed to Mitanni influence: s'uvardata (*svarda_ta 'given by heaven'; s'atuara (*satvata = satvan 'powerful, victorious: a warrior), artamanya (r.tamanya 'thinking on th elaw'), biridas'va (vr.ddha_s'va 'possessing large horses') biryawa_za (vi_ryava_ja 'having the prize of valour'), indarota (indrota (RV) 'helped by Indra), s'ubandu (subandhu). In the Kassite documents there is a list of names of gods with Babylonian equivalents: s'urias' (rendered s'amas') equated with Sanskrit 'su_rya. Maruttas' the war god (rendered En-urta) is compared with Sanskrit marut. Among the kings of the Kassite dynasty (ca. 1750-1170, apparently originating in the mountainous regions of western Iran) is a king names abirattas' (abhi-ratha 'facing chariots (in batle)'. (T. Burrow, ***The Sanskrit Language***, London, Faber and Faber, 1955).

"Although hurlili constitutes a linguistic definition, and is basically a self-descriptive term, that corresponded to one in the Mitanni letter itself (hurwohe, hurrohe 'Hurrian'), several scholars went along with Ungnad's suggestion and called the language 'Subarian' after the place name Subartu found in Babylonian (Ungnad 1915, 1923, 1936: 133ff.). Since the language is already attested in proper names in the Ur III period (Hommel 1913) and earlier (Thureau-Dangin 1912), but the name Hurrian itself only since the Old Hittite period, Ungnad wanted to keep the word 'Hurrian' for the 'Subarian' of the Bogazkoy texts, even though he himself discovered that there was no essential difference between 'Hurrian' in this sense and 'Subarian' of the Mitanni

letter...The excavations in Hattus'a, Mari, Ugarit, and Emar yielded new Hurrian texts...and the roster of Hurrian proper names rose into the thousands as a result of material uncovered in Nuzi, Kurruhanni, Alalakh, Ugarit, and many other places...One particularly extreme position was adopted by Ungnad (1936), who considered them to be the oldest ethnic substratum of Mesopotamia and of prime importance in post-neolithic culture..A new approach to the subject was postulated by I.J.Gelb, who proposed a clear-cut distinction between Hurrians and Subarians. In his view, the latter had been the linguistic and ethnic substratum of northern Mesopotamia since earliest times, while the former were merely late arrivals, a view shared by Speiser... (Gelb 1944)...

“Undue importance has long been attached to the historical significance, still controversial today, of the groups speaking Indo-Aryan, the origin of a whole range of names and appellatives which appear from the 15th century BC onwards in texts from the Hurrian Mitanni kingdom and its political and cultural spheres of influence. Investigations into this specialist area within Hurrian studies have been charted by M. Mayrhofer (1966, 1974) in the form of an analytical Bibliography... the question of a possible prehistoric migration, perhaps from the other side of the Caspian Sea (Kammenhuber 1977, 1978: 214), must remain a matter for speculation until new sources come to light...Hurrians may be presumed to have been in the Near East from early times on the basis of the old Sumerian craft-word ta/ibira, 'copper worker', for which convincing proof of a Hurrian source can be adduced (Otten 1984, Wilhelm 1988). Atal-s'en describes himself as the son of one S'atar-mat, otherwise unknown, whose name is also Hurrian. The rule of Atal-s'en cannot be dated with certainty, but probably belongs to the end of the Gutian period (ca. 2090-2048 BC), or into the first decades of the Ur III period (2047-1940 BC)...

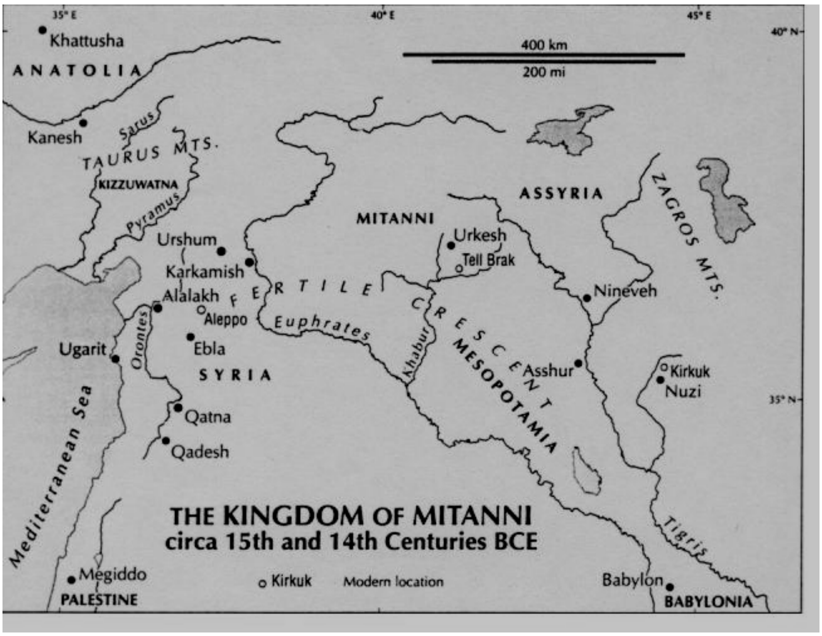
“Records from the Ur III period reveal that the mountain areas to tbe east and north of Tigris and Euphrates valley were at this time occupied by Hurrian-speaking peoples, who had meanwhile also penetrated the eastern Tigris country to the north of the Diya_la...As a result of S'ulgi's (2029-1982) wars, large numbers of Hurrian prisoners found themselves in Sumer, where they were employed as a labour force. This why so many people with Hurrian names can be traced in Southern Mesopotamia in the Ur III period...the etymology of some names is certainly or most probably Indo-Aryan, for example Artatama = Vedic r.ta-dha_man 'whose abode is R.ta', Tus'ratta

(Tuis'eratta) = Vedic tves.a-ratha 'whose chariot surges forward violently', Sattiwaza = Old Indo-Aryan *sa_ti-va_ja 'acquiring booty', Vedic va_ja-sa_ti 'acquisition of booty' (Mayrhofer 1974: 23-25)...since the Hurrian language was in use in the 14th century BC at least as far away as Central Syria (Qatna, also probably Qadesh), and since this expansion probably results from the population shifts during the rise of Mittani, it is not a priori impossible that Indo-Aryans also made their way to this part of the country...

“Among the gods who were still being honoured in the late 14th century by the kings of Mittani, we find Mitra-, Varun.a-, Indra-, and the Na_satya-twins, who are known to us from the Vedas, the oldest Indian poems. However, in as much as they are only attested so far in two versions of a state treaty (Laroche 1971 Nos. 51 and 52), the worship of these deities may have been restricted to dynastic circles. The inherited names of the kings of Mittani make it clear that the Indo-Aryan speaking groups played a role in the changing scene in North Mesopotamia in the 16th and 17th centuries which was not unconnected with an accomplishment suggested by the sparse remains of the Indo-Aryan language itself: various terms for horses, current in Nuzi in the early 14th century BC, were certainly or probably of Indo-Aryan origin (Mayrhofer 1966: 17ff., 1974: 29f.; also Kammenhuber 1968: 211ff.), and a Hittite tract on training horses (Kammenhuber 1961) derives from a Mittani expert in this field and contains Indo-Aryan technical terms, and from these two facts we may deduce that the Indo-Aryans were experienced in the breeding and training of horses. A combination of this equestrian skill and the use of the two-wheeled chariot engendered a military expertise which without doubt contributed much to the expansion of the Mittani kingdom...The two-wheeled chariot itself is now generally considered to have developed in the Near East and not, as once thought, to have been imported by the Indo-Aryans...

Map of the kingdom of Mitanni, ca. 14-15th cent. BC

“In Mittani as well as in Syria and Palestine chariot-drivers were called marijanni-na, a term that has often, though not uncontroversially, been linked with the Old Indian marya 'yong man' (in Avestan also 'member of a group of men' (Mayrhofer 1966: 19, 1974: 16, Kammenhuber 1968: 222f., Diakonoff 1971: 76, Laroche 1980: 168)... (Gernot Wilhelm, **1989, *The Hurrians***, trans. by Jennifer Barnes, Warminster, Aris and Phillips Ltd.)."...on the other side of the Fertile Crescent. Here, from the beginning of the historical record to the middle of the second millennium BCE, it was the Hurrians who penetrated the agricultural regions of the lowlands--through long periods of time peacefully and as individuals, but occasionally en masse and in a warlike manner. The earliest written sources providing information about the political and linguistic situation in northern and eastern



Assyria as well as in western upper Mesopotamia reveal that Hurrian minor states already existed in these districts about 2200 BCE. We cannot say when Hurrians first arrived in this area. Linguistic criteria, however, seem to indicate that the ancestors of the historical Hurrians had already inhabited the mountainous regions of eastern Anatolia for several centuries... The Sumerians probably borrowed their word for 'coppersmith' (TABIRA, TIBIRA) from proto-Hurrian [Hurrian **tab-li** 'copper founder'; **tab-iri** 'the one who has cast (copper)']...

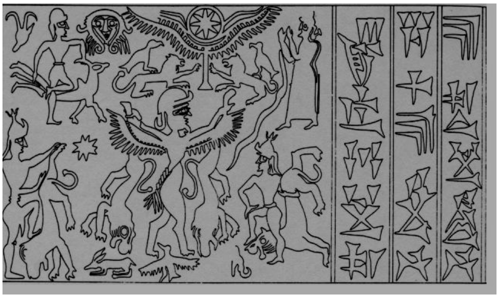
"...letters and documents of the Old Assyrian trading colonies of the twentieth and nineteenth centuries... reveal that although practically no Hurrians lived in Kanesh (modern Kultepe), the center of trading activity, Hurrian names were common south of the Anti-Taurus Mountains in this period. We do not know when Hurrians migrated into the area between the Euphrates and the Mediterranean. The Ebla tablets of the twenty-fourth and twenty-third centuries give no indication of Hurrians in this region...

"...The Egyptian tomb biography of Amenemhet, an official who claimed to have invented a device for measuring time, refers to events of the final decades of the sixteenth century and includes the earliest mention of the name of this trans-Euphratean Hurrian state: Mitanni. This designation originates from the personal name Maitta, which is often attested in texts from Nuzi (modern Yorghun Tepe)...The names of the kings of Mitanni are known to us only from the early fifteenth century and later. Not one of these names is Hurrian. Rather, they are all derived with more or less certain etymologies from an archaic form of Indo-Aryan...In addition, a number of gods known from ancient Indian religious texts, such as Mitra (Mithras), Varuna, and the divine pair of the Nasatya, were worhipped at the court of the Mitannian dynasty. Finally, a number of words of Indo-Aryan origin are found in texts having some relation to Mitanni, most importantly terms associated with horse breeding, as well as the designation for the Mitannian chariot driver (**mariyanni**)... As the dynasty of Mitanni maintained the tradition of Indo-Aryan throne names into the thirteenth century, we may assume that the dynasty itself was of Indo-Aryan origin... the language spoken in Mitanni remained Hurrian...

"...At present the earliest known direct evidence for a Mitannian ruler is the seal of a King Shuttarna, son of Kirta. Impressions of his seal are found on two records from the second half of the fifteenth century produced by a later king, namely, Saushtatar...

Drawing of the seal impression of King Saushtatar, Mitanni; from a tablet found at Nuzi; now in the museum at An Nasiriyah, Iraq (drawing by Diana Stein-Wunscher). The seal also gives the name of Saushtatar's father: Parsatatar. Legend on the impression: Saushtatar, son of Parsatatar, Kind of Maittani. The seal draws upon the glyptic heritage of northern Mesopotamai, where the repertoire of Early Dynastic and Akkadian themes was revived by

multifarious winged monsters and demons. Created at the height of the Mitannian kingdom, this seal survived several generations as a dynastic seal used by Artas'umara and Tus'ratta at Tell Bra_k (Finkel 1985; Oates 1987) and by an unknown king at Nuzi (Stein 1989). The seal impressions on tablets have been found at Nuzi, Iraq and Brak, Syria. Porada, 1979, Fig. 2. Period Vb.



Cylinder seal impression of S'uttarna, son of Kirta (Collon, 1975); Tell Atchana (Alalakh IV), Turkey. Impressions on tablets AT 13,14. Legend: Suttarna, son of Kirta, King of Maittani; two lions are defeated by a central single human-headed lion-demon in bird costume; worn and recut, the seal is used as a dynastic emblem by Saus'tatar in mid second millennium BC; two tablets found in Alalakh which record judicial decisions taken by Saushtatar are authenticated with the 'dynastic seal', which bears the legend' S'uttarna, son of Kirta, king of Maitani'. The seal reflects the style of Post Akkadian and Ur III periods (Collon 1975). "The contest scene, first introduced as a frieze of overlapping figures during the Early Dynastic period, is epitomized at the height of the Akkadian period as a symmetrically composed conflict between balanced pairs of protagonists. Long associated with kingship, this theme developed into the three-figured struggle depicted on the seal of S'uttarna, in which an animal victim is pitted against two human assailants (Collon 1982: 111). The seal was used as a dynastic seal by Saushtatar of Mitanni in about 1450 BC; it was probably originally cut in the late 3rd millennium BC but was subsequently recut along the lines of the original design and a new inscription was added. Antakya and BM; Collon, 1975, No. 230.

"The seal of Shuttarna I still stands fully in the tradition of Mesopotamian glyptic...The rule of Parrattarna I is to be dated to the first half of the fifteenth century...Already in the late sixteenth and early fifteenth centuries the expansion of Egypt under the first kings of the Eighteenth Dynasty had led to a confrontation with Mitanni. After the reign of Queen Hatshepsut, who interrupted this military expansion, Thutmose (Tuthmosis) III continued his grandfather's tradition and through far-ranging campaigns attempted to subjugate much of Syria to Egyptian rule...

"...The son and successor of Artatama, Shuttarna II, sent another Mitannian royal daughter to Egypt, where Amenhotep (Amenophis) III now rules...About 1365, Amenhotep was forced to break off diplomatic relations with Mitanni after the murder of its king. Following Shuttarna II, his son Artashumara became king, but after what was probably only a short reign--recently documented by a record from Tell Brak issued in his name-- he was murdered and replaced by a younger brother Tushratta, who was still a minor...The most important source for the history of Mitanni from the reign of Artatama I on is constituted by the letters that Tushratta later--after his assumption of full rule--sent to the pharaohs. In these letters, which were discovered at Tell al-Amarna (Akhetaten) in Middle Egypt, he often refers to past events...He mentions as his initial military success a victory over the Hittites...Amenhotep accepted Tushratta's offer of the resumption of friendly relations. On his side, hearing of an illness of the pharaoh, Tushratta sent him the statue of the famous goddess Shawushka of Nineveh, as his father Shuttarna had already done before him...

"...A Hittite army was sent to reconquer Mitanni, where Kili-Teshub henceforth bore the Indo-Aryan throne name Shattiwaza (formerly also read as Mattiwaza or Kurtiwaza). Since a copy of the Hittite-Mitannian treaty was deposited before 'Teshub, lord of the KURINNU of Kakhat,' this city, which probably is to be identified with Tell Barri (near the center of the Khabur triangle), must have belonged to the area controlled by Shattiwaza...Hittite influence over Mitanni was not of long duration. Shuppiluliuma died a few years later; his successor, Arnuwanda II, survived him for only about a year; and the next king, Murshili II, was still a youth and lacked the prestige of an experienced warrior...

"...Shattiwaza's country was no longer called Mitanni, but rather Khanigalbat...we learn that a king of Khanigalbat by the name of Shattuara I, probably the successor of Shattiwaza, owed tribute to Assyria...A change took place when the son of Shattuara, named Wasashatta (the inversion of Shattiwaza), in vain sought the support of Khatti against Assyria..."

(Gernot Wilhelm, 1995, The Kingdom of Mitanni in Second-Millennium Upper Mesopotamia, in:Jack M. Sasson (ed.), ***Civilizations of the Ancient Near East***, Vol. II, pp. 1243-1254).

Chronology

The dates at typical sites of the civilization based on MASCA correction of Carbon-14 are as follows and seem to tag with the Mesopotamian chronology:

EARLY INDUS	
Amri	3160 BC, 3540 BC
Dam Sadaat	2630-2670 BC, 3150 BC
Kot Diji	2700-2820 BC, 2920—2940 BC
Balakot	2550 BC, 3180 BC
Kalibangan	2140 BC, 2920-2940 BC

MATURE INDUS	
Ghaligal	2180 BC
Mohenjodaro	2110 BC, 2600 BC
Kalibangan	2040 BC, 2690-2800 BC
Lothal	2120-2140 BC, 2490-=2540 BC
Surkotada	2120-2140 BC, 2880-2900 BC

[K.S. Ramachandra, ‘Dating the Indus Civilization’, in B.B.Lal and S.P. Gupta, eds., *Frontiers of Indus Civilization*, 1984, pp. 538-539).

Mesopotamian Chronology

The Mesopotamian chronology is as given by J.A. Brinkman in A. Leo Oppenheim, Ancient Mesopotamia (rev. edn., Chicago, 1977, 355ff.):

Ubaid	c. 5500-4000
Uruk (Early/Middle)	c. 4000-3500
Uruk (Late/Jamdat Nasr)	c. 3500-3000
Early Dynastic I	c. 3000-2750
Early Dynastic II	c. 2750-3600
Early Dynastic III	c. 2600-2350
Akkadian (or Sargonic)	c. 2100-2000
Ur III	c. 2100-2000
Isin-Larsa/Old Babylonian/Old Assyrian	c. 2000-1600
Kassite/Mitannian/Middle Babylonian/ Middle Assyrian	c. 1600-1000

Bharata-s evolved indigenously in the Sarasvati River Basin

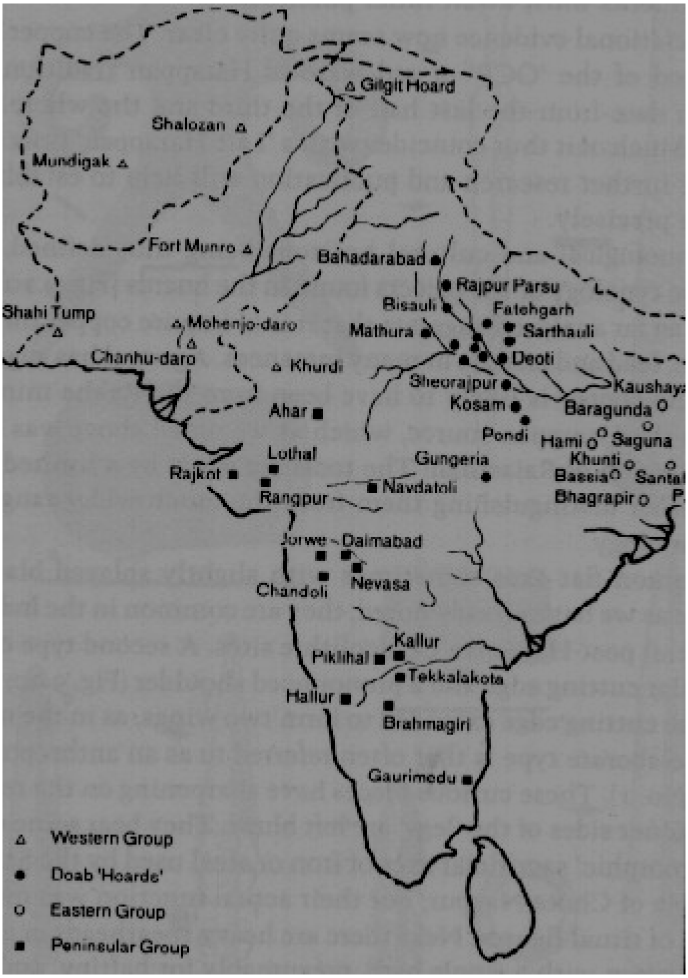
R.gveda does not refer to 'Aryans' as a race but as an appellation connoting dignified or respectable persons. Even assuming that 'Aryans' were a people speaking a group of languages of the 'linguistic area', the archaeological indications point to an indigenous evolution of the people on the banks of the Rivers Sarasvati and Sindhu, in a continuous sequence, right from ca. 9000 BP(Mehergarh). If migrations are attested, they are not from far off lands but within Bharat, from the Sarasvati River Basin towards Gujarat and South India and towards Ganga-Yamuna doab.

"The discovery of unburied skeletons among the latest levels of the Harappan occupation at Mohenjodaro combined with uncritical and inaccurate readings of the Vedic texts led some scholars to claim that the decline of the Indus civilization was the result of 'invasions' or 'migratgions' of Indo-Aryan speaking Vedic/Aryan tribes. (Wheeler, R.E. Mortimer, 1968, The Indus Civilization, 3rd edn., *Cambridge History of India*, Cambridge, Cambridge University Press). The invasion and/or migration models assumed that the Indo-Aryan speaking Vedic communities destroyed the Indus cities and replaced the complex urban civilization with their new rituals, language and culture. Many scholars have tried to correct this absurd theory, by pointing out misinterpreted basic facts, inappropriate models and an uncritical reading of Vedic texts. (Jarrige, Continuity and Change in the North Kachi Plain; Shaffer, Reurbanization: The Eastern Punjab and Beyond; loc. cit. Kenoyer, 1998). However, until recently, these scientific and well-reasoned arguments were unsuccessful in rooting out the misinterpretations entrenched in the popular literature. (Brown, Dale M., ed., 1994, *Ancient India: Land of Mystery*, Alexandria, Va., Time-Life Books)...there is no archaeological or biological evidence for invasion of mass migrations into the Indus valley between the end of the Harappan Phase, about 1900 BC and the beginning of the Early Historic Period, around 600 BC. In Central Asia and Afghanistan the Bactria-Margiana Archaeological Complex (BMAC), dating ffrom around 1900 to 1700 BC, represents a complex mixture of nomadic and settled communities, some of these may have spoken Indo-Aryan dialects and practiced Indo-Aryan religion. These communities and their ritual objects were distributed from the desert oases in Turkmenistan to southern Baluchistan and from the edges of the Indus Valley to Iran. As nomadic herders and traders moved from the highlands to the lowlands in their annual migration, they would have traded goods and

arranged marriages as well as other less formal associations resulting in the exchange of genes between the highland and lowland communities." (Kenoyer, J.M., 1998, p. 174).

Since Wheeler's hasty generalization, many discoveries have been reported which render it possible to reconstruct an indigenous and continued evolution and development of the civilization in the Sindhu Sarasvati River Basins. Outside these river basins, cultural complex of Bactgria-Margiana Archaeological Complex (BMAC) has been discovered. There is little evidence of cultural materials being transferred into or from this complex, though evidences of trade contacts have been identified. (Frederik T. Hiebert, 1994, Production evidence for the origins of the Oxus civilization, *Antiquity 68*: 372-87; Victor Sarianidi, 1993, Recent archaeological discoveries and the Aryan problem, in: *South Asian Archaeology, 1991*, Adalbert J. Gail and Gerd J.R. Mevissen, eds., Stuttgart, Steiner: 252-63). The internal migrations to the Ganga-Yamuna, caused principally by the desiccation of the Sarasvati River, have been well documented, with reference to new surveys and excavations of new sites. (Bisht, Ravinder Singh, 1987, Further excavations at Banawali, 1983-84, in: B.M.Pande and B.D. Chattopadhyaya, eds., *Archaeology and History*, Delhi, Agam Kala Prakashan: 135-56; Dikshit, K.N., 1991, The legacy of Indus civilization in North India, in: *Puratattva* 21: 17-20; Joshi, Jagat Pati, 1978, Interlocking of Late Harappan culture and Painted Grey Ware culture in the light of recent excavations, in: *Man and Environment 2:* 90-101; Shaffer, Jim G., 1993, Reurbanization: the eastern Puunjab and beyond, in: Urban Form and Meaning in South Asia in: Howard Spodek and Doris Meth Srinivasan, eds., *The Shaping of Cities from Prehistoric to Precolonial Times*, Washington D.C., National Gallery of Art: 53-67). Similarly, the migrations from Sind to Rann of Kutch and beyond, southwards towards the Saurashtra and Kathiawar regions of Gujarat have also been documented based on new surveys and excavations. (Bahn, Kuldeep K., 1992, Late Harappan Gujarat, in: *Eastern Anthropologist* 45: 1-2: 173-92; Possehl, Gregory L., 1992, The Harappan civilization in Gujarat: the Sorath and Sindh Harappans, in: *Eastern Anthropologist* 45:1-2: 117-54; Possehl, Gregory L., 1991, The Harappan cultural mosaic: ecology revisited, in: Catherine Jarrige, ed., *South Asian Archaeology, 1989*, Madison, Wis., Prehistory Press: 237-44). A review of these new discoveries and evaluations have led to the presentation of alternative theories to explain the decline of the Indus cities and the continuation of the urban Indo-Gangetic tradition. (Kenoyer, J. Mark, 1995, Interaction systems, specialized crafts and culture change: the Indus Valley

tradition and the Indo-Gangetic Tradition in South Asia, in: George Erdosy, ed., *The Indo-Aryans of Ancient South Asia: Language, Material Cultgure and Ethnicity*, Berlin, de Gruyter, 213-57; Shaffer Jim. G, and Lichtenstein, Diane A., 1995, The cultural tradition and palaeoethnicity in South Asian archaeology, in: George Erdosy, ed., *The Indo-Aryans of Ancient South Asia: Language, Material Cultgure and Ethnicity*, Berlin, de Gruyter, 126-154).



Recent excavations (1996) at Harappa have led to the discovery of a small pot containing varieties of 133 beads. The find is dated to ca. 1730 BC. Included in these beads was a red-brown glass bead, heralding the beginning of local glass production. The same colour of glass bead becomes ubiquitous in the Early Historical period (600-300 BC) throughout northern India and Pakistan. (Kenoyer, J.M., 1998, p. 176).

The Heritage cherished in Bha_rat

The heritage of the civilization continues in Bha_rat; hence, the proto-forms of the present-day languages of Bha_rat hold the key to the problem of identifying the language of the civilization.

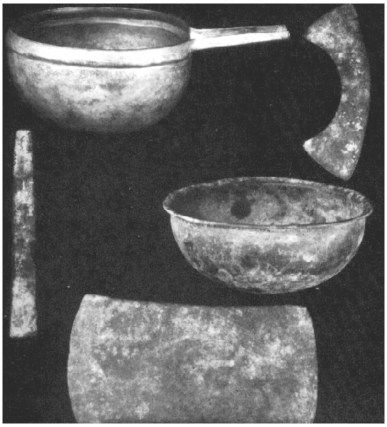
The culmination of the basically riverine/maritime civilization, recording a transition from the Early phases to the Mature periods which opened up trade opportunities created by the Bronze Age, took palce in the Sarasvati River basin. It is on this basin that the mature Harappan culture evolved upon the earlier material culture of the civilization. This is the principal reason for the suggestion made by S.P. Gupta that instead of the older title, the Indus Civilization, we might call it 'Sarasvati Civilization' or 'Sarasvati Culture'. (Gupta, S.P., 1983).

Ganeshwar culture is a distinct entity which supported the evolution of Bronze Age for the Civilization and the settlements are on the basins of Kantli and Dohan rivers. The culture is remarkable for the contribution made to the development of metalsmithy fundamental to the evolution of the bronze age in India. The culture could have been the supply base (Meluhha = copper] of copper products from the mineral wealth of the Khetri copper mines of the region. In the late phases, two new areas were occupied: the palaeo-Yamuna channel in the Bharatpur district of North-eastern Rajasthan (Gupta et al, 1977) and the Ganga system in North-eastern Uttar Pradesh. The extension was more or less in the same region where once the Copper Hoards and/or the Ochre Coloured Pottery (OCP) proliferated. This is a significant pointer to the nature of the economic activity which sustained the maritme civilization in its mature phases: trade on Bronze Age metallic weapons and tools. (This will be further elaborated in the context of the decipherment of the inscriptions of the civilization).

The migratory path of the metallurgists who were adept in copper towards the Gangetic plain had perhaps followed the path of Chambal as a tributary of the Ganga at Prayag. This hypothesized migration is consistent with the migration of the Harappans toward the Ganga-Yamuna doab, from the southern Punjab area after the desiccation of the Sarasvati River. Thus, it is significant that the first iron works were located near Mathua on the Yamuna River.

India: findspots of copper and bronze objects (After Bridget and Raymond Allchin, 1982, Fig. 9.19). These findspots are likely to provide a framework for analyzing further the internal routes of migration after the desiccation of the River Sarasvati.

Yamuna River is the frontier between the Sarasvati Sindhu culture and related, indigenous cultures in other parts of India. In the Ganga-Yamuna doab, Chota Nagpur hills, Central India,Orissa and South India, hoards oc copper weapons and tools have been found. At Rajpur Parsu and Bisauli, the sites of the copper hoards were found to be associated with Ochre Coloured Pottery (OCP). Excavations at Hastinapura, below the Early Iron Age levels also revealed OCP. Most of the OCP sites on the Ganga alluvial plains. Excavations at Bargaon and Ambakheri revealed pottery material comparable to Late Harappan. "Thus we may expect to find two paralle and intgerleaving series: one deriving ultimately from an Early Indus source, comparable to the Siswal tradition in the Punjab, and the other deriving from sites where there was a direct Harappan presence, degenerating in later times into the so-called 'Late Harappan' character (as is witnessed at Bara or Alamgirpur)…OCP is generally followed by a short second period in which black-and-red burnished ware is discovered. The earliest evidence of iron comes from this period. In some sites there appears to have been no black-and-red ware phase, but a gradual appearance of Painted Grey Ware which too is associated with the earliest appearance of iron at several sites…These record a spread of 2650-1180 BC…A feature of some sites on the Ganges-Jamuna alluvium is that they appear to have been flood-washed during the early period, suggesting that the second millennium may have witnessed considerable tectonic uplift, leading to widespread shifts of river courses and flooding...The copper hoards of these two groups, those of Doab, and of the eastern area or Chota Nagpur, appear to form a separate cultural entity...At Ahar heaps of semi-fused glass-like copper slag, along with copper tools, were discovered in a context dated to ca. 1800 BC. Clearly, Ahar was a copper-smelting center, and there are indeed extensive copper deposits in the nearby Aravalli hills, sometimes associated with old shafts and slag heaps, of as yet undetermined age...Gilund is about 80 km. northeast of



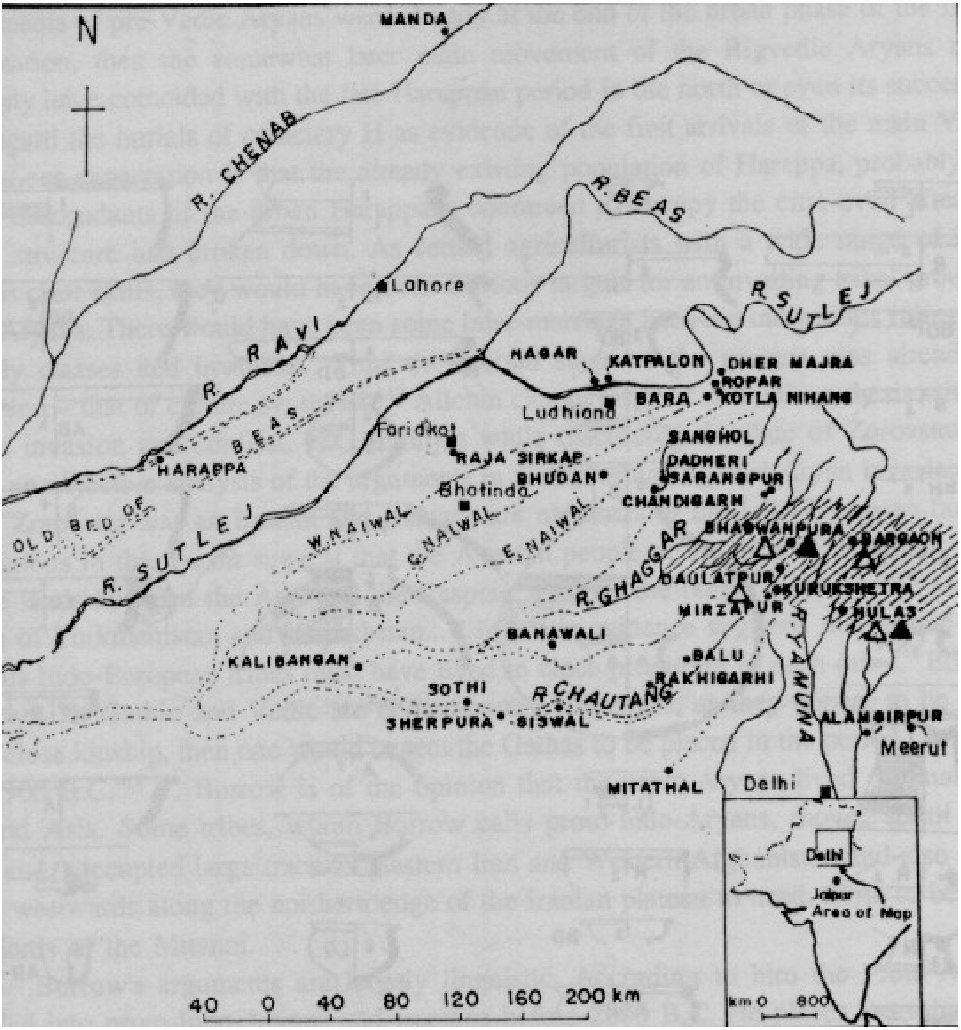
Ahar...with painted black-and-red ware appearing throughout...A copper hoard from Khurdi (properly Kurada) in the Nagaur district of Rajasthan including a fine bowl with a long protruding channel spout...and several flat double choppers of copper ...The early use of iron in India...Period I: 1300-1000 BC...The earliest report is from south Rajasthan (Ahar)...Period II. 1000=800

BC. Iron reported to be more common...Period III. 800-500 BC. First occurrence in the Middle Ganges valley and Ganges delta regions...the generalization needs to be treated with every caution."(Bridget and Raymond Allchin, 1982, pp. 254-262, 345).

Kurada, Nagaur district, Rajasthan:: copper objects (Jodhpur Museum) [Note: kurada also means an axe].

"The earliest ironworks (1200 BC) were located in the northern Aravalli hills, close to the important sites of Mathura, Noh, Bairat and Indrapat (Delhi), which lie in the core area of the Indo-Gangetic tradition. Later, during the early Northern Black-polished Ware period, a second iron source area was exploited far to the east, in the Chota Nagpur plateau, adjacent to the most important sites of the middle and lower Ganga plain, i.e. Rajgrha, Pataliputra and Champa. (Chakrabarti, Dilip K., 1985, Iron and urbanization: an examination of the Indian context, in: *Puratattva 15* (1984-85): 68-74; Dilipo K. Chakrabarti, 1976, The beginning of iron in India, in: *Antiquity* 50: 114-24, 150). The control of iron production and trade have been a critical factor in determining the location and eventual dominance of the major cities and capitals of the Early Historical states." (Kenoyer, J.M., 1998, p. 180).

Late Harappan (LHP), Ochre Coloured Pottery (OCP) and Painted Grey Ware



(PGW) sites in Haryana and Punjab (After S.R. Rao, 1991, Fig. 72).

That no site of the civilization has so far been found on the Chenab and Beas (except for the lone site of Manda on the Chenab), is a pointer to the changes in the courses of rivers in this region, caused by river migrations and river captures (attested by earth science studies, consistent with the archaeological evidence). There are no sites between Manda and Rupar primarily because the Ravi, Beas and Sutlej Rivers had erratic courses with frequent migratory changes in their flows. There is a possibility that the city of Harappa was

located on the northern bank of the river in ancient times (Pendall, E. and Amundson, R., 1993, Soil survey. In, George F. Dales and J. Mark Kenoyer, The Harappa Project 1986-89: new investigations at an ancient Indus city. In, Gregory L. Possehl, ed., *Harappan Civilization: A recent perspective*. 2nd edn. Delhi: Oxford and IBH and the American Institute of Indian Studies: 515-17).

For example, nineteenth century reports describe that vast tracts of land between the Ravi and Sutlej could not be cultivated because they are on the annual flood tracts; hence, the tracts of land were only put to seasonal pasture. (*Gazetteer of the Montgomery District* 1884). Possibly, similar situation existed during the Harappan cultural phases.

Manda (Chenab river): double spiral-headed pin ((Period IA); the pin is 12.8 cm. Long; the object is similar to the pins found in West Asia (Piggott 1948) (After Joshi, J.P., 1982, Pl. 16.2).

The explorations made by Joshi et al in the area south of Bhatinda, along the dried-up tributaries of the Ghaggar River in Mansa Tehsil (Dist. Bhatinda) have led to the discovery of a significant number (20 sites within an area of 50 X25 kms.) of very large sites (e.g. cities such as Dhalewan, Gurnikalan, Baglian Da Theh, Lakhmirwala and Hasanpur; towns such as Karampura, Dallewala 1, Sahnewali, Hirke, Dallewala 2 and Baran 2). This area adjoins the Sriganganagar district of Rajasthan (where the site of Kalibanga is located). This an indication of the pattern of movement from northern to the southern Punjab, linked by the Sirhind tributary of the Ghaggar River for transport of deodar wood for house-building. (Joshi 1982, pp. 8-9). Large number of sites were found clustered in the districts of Patiala (Punjab) and Hissar (Haryana). Late Harappan sites, which are larger in number than the Mature Harappan sites, are generally located on small rivers in the north-western Ganga-Yamuna doab and parts of Haryana. When the large Sarasvati River dried up in major stretches, people from the larger-sized settlements moved into an increased number of smaller-sized settlements, setting the foundation for Village India of the historical periods.

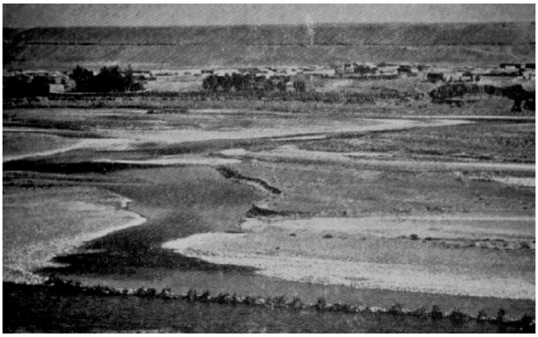
There are indications of a possible land-route used for movements of people from Sind via Kutch into Gujarat (evidence of 25 sites located between Sind and Gujarat) (Joshi, 1972, p. 143). It may be hypothesized that this land route through the Rann of Kutch and the Little Rann of Kutch might have constituted the ancient course of the Sarasvati River beyond the Rann and upto the meeting point with the Arabian Sea (at Lothal, in the Gulf of Khambat and at Prabhas Patan (Somnath) on the Arabian Sea coast of Saurashtra). More field work has to be done in this area to delineate the palaeo-channels of the Sarasvati River. There are indications that the Nal Lakes between the Little Rann of Kutch and Lothal are relics of the Sarasvati River, similar to the lakes formed in Haryana (Brahmasar, Jyotisar, Sannihitasar, Thanesar) and Punjab (Manasa lake in Mansi Tehsil). The formation of lakes is principally governed by the topography of the areas which are susceptible to flooding either by the waters of the Sutlej or during monsoon. This leads to the formation of lakes which are filled up by silt and sediments brought in by the rivers or by the moon through the palaeo-channels of the ancient river systems.

Apart from the evidence of Cholistan (Bahawalpur province: Mughal, 1982) for a continuity of the late Harappan culture into the Painted Greyware culture (PGW), excavations at Bhagwanpura and Dadheri byu Joshi et al have shown stratigraphic overlap between the late Harappan and the PGW culture (Joshi and Madhubala, 1982, 191 ff.). Thus there is a clear cultural continuity between the Harappan and post-Harappan phases of the civilization. (Josh et al., 1984, p. 514).

The settlements on the Sarasvati River basin were thus, on three interacting, rivering zones: Sirhind and Sarasvati upper reaches; Sarasvati River in Rajasthan and Bahawalpur; Sarasvati River in Kutch and Saurashtra which also formed a network of ports for the maritime activities of the civilization. Most of the sites of the Mature phase are on the banks of the Sarasvati River, with Mohenjodaro and Harappa on the Sindh River acting as trading outposts.

The transition from Sarasvati to Haraquaiti

Haraquaiti near Kandahar and Mundigak, joining the Haetumant (Hilmand) river; archaeological sites in Arachosia, Drangiane, Gandhara, Areia, Baktriane (After Fischer, K., 1970, Projecfts of archaeological maps from Afghan-Seistan between 31 20' to 30 50'N and 62 00' to 62 10'E., in Zentralasiatische Studien, No. 4, Wiesbaden; loc. cit., Fischer, Klaus, 1973, Archaeological Field surveys in Afghan Seistan 1960-1970, in: Norman Hammond, ed., *South Asian Archaeology*, Duckworth, London, Fig. 10.1).



Shortugai sites: Terrace on the right bank of Kokcha,m seen from the opposite bank, the Khwaja Ghar area. In the foreground, head of the left bank canal, which irrigates the plains of Archi several kilometers away . (After Gardin, Pl. 139).

Location of Helmand River (Skt. Setu-mant) in relation to the Sindhu and Sarasvati Civilization area and the Bactria-Magdiana Culture. (After J.C. Gardin, Canal Irrigation in Bronze Age, Eastern Bactria, in: Lal and Gupta, 1984, Fig. 35.3). The major rivers are the Oxus (Amu Darya) and its major tributary from the South, the Kokcha. "The earliest traces of settlement have been found in the Taluqan area, in the form of potsherds attributed to the first half of the 3rtd millennium...Parallels have been found by Bertille Lyonnet in Mundigak (level IIII), Baluchistan, Amri and Kot Diji...The provisional interpretation, pending an opportunitgy to study unpublished collections from Soviet Central Asia, is that people from the Indian borderlands migrated as early as the beginning of the 3rd millennium BC towards the Amu Darya basin, and settled in eastern Bactria, in the Taluqan area...A stream flows in this zone,

the Rud-I Shahrawan... (Rud – river, whereas canals are called nahr)...technical difficulties involved in bringing water from the river bed to the higher terraces in which the Shortugai sites are located...a sudden introduction of sophisticated irrigation techniques… (explained by) the arrival of Harappan settlers already acquainted with irrigation technology, or by an expansion northwards of the people, also of Indian origin, who had settled a few centuries before in the Taluqan area...Potsherds of the same period as Shortugai (ca. 2400-1800 BC) have been found in other areas...” (J.C. Gardin, opcit., pp. 316-317).

“Many explorers, MacMahon and Curzon for example, agree that Seistan offers a special phenomenon which puzzles students of comparative geography and archaeology. The shallow lakes alternately swell, recede and disappear and the rivers are constantly shifting their beds. Consequently settlements were created and abandoned in short periods. While the country owes to the abundant alluvium its wealth and fertility, it also contains more ruined cities and habitations than are perhaps to be found within a similar space of ground anywhere in the world...An archaeological map of Afghanistan shows the major sites of historical and artistic interest explored so far: the prehistoric mound of Mundigak with pottery ornamented both in ancient Iranian style and with the Indus valley patterns, the provincial capital of Kandahar in the vicinity of which were discovered Greek and Aramaic versions of Ashoka inscriptions; Buddhist monasteries, stupas and caves embellished by Gandhara-style sculpture and painting, namely Bamiyan, Fondukistan, Hadda, Qunduz; the ‘mother of cities’ from Zoroastrian to Islamic times—Balkh; a dynastic sanctuary of the Kushans to be connected with the art of MathuraSurkh Kotal; places with remains of Hindu-Shahi temples and images, for example Gardez and Chigha Sarai; centers of Islamic architecture and decoration—Lashkari Bazar, Ghazni and Heart. Seistan, known to the Greek and Roman world as Drangiane, is just being explored. The vast desert is covered by mud-brick remains. Moving sand dunes encircle old fortresses, like that of Sangar. Recently we have located prehistoric and early historic tepes, mounds and wall systems deriving from the periods of the Parthians, Sakas and Sasanians, and abandoned Islamic cities with soaring mud-brick walls and towers...

“Seistan was in prehistoric times a densely populated country...Seistan was crossed by Alexander the Great in the autumn of 330 BC...During the thirteenth and fourteenth centuries the inhabitants opposed the Mongol invasion, were conquered and totally destroyed. The irrigation works were wasted, the cities burnt and life seemed to end...The water of the Helmand was

again used in canals and carried to distant points in the country; new canals were built and old ones repaired. Natural changes in climate and reduction of water supply seem to have restrained people from settling far from the river. Finally the population was forced to keep cattle and fields in the plain near the Helmand." (Fischer, Klaus, opcit., pp. 133-134).

It would appear that change of the Old Indic names into Iranian forms when they moved into the area may explain the following concordances: Sarasvati_ as Haraxvaiti, Sarayu as Haroiiu and Gomati as the Gomal.

In this context of faunal remains found in mesolithic sites in Rajasthan, it will be apposite to review a claim made by Alfred Hillebrandt that the early references to Sarasvati_ in the R.gveda should be traced to Sarasvati_ of Arachosia, which according to Hillebrandt is the 'western Sarasvati_' as distinct from the 'eastern' Sarasvati_ in located in Kuruks.etra. "The worshippers of Pu_s.an lived in the vicinity of the Sarasvati_…Book VI takes us to the banks of the western Sarasvati_ and book VII, on the other hand, to the area of Kuruks.etra, to the holy Sarasvati_ of the middle country.

There at the Arghandab in Arachosia, Vadhryas'va's son Divoda_sa fought against the Pan.is, Pa_ra_vatas and Br.saya, and the river of the country "who consumed the Pan.is" (RV 61.1) stood by his side as a guardian deity. In the same book which thinks of the Pan.is with special hatred we see Pu_s.an "who pierces the Pan.is" at the center of the cult, and he is mentioned once in the Sarasvati_ hymn also (RV 6.61.6). Pu_s.an and Sarasvati_ occur side by side elsewhere too. 6.49.7 Sarasvati_; 8 Pu_s.an; 10.17.3-6 Pu_s.an; 7-9 Sarasvati_; 65.1 (Va_yuh) Pu_s.a_ Sarasvati_. Their association has been continued especially in liturgical texts. (cf. TS 1.2.2; 6.1.2.2: sarasvatyai pu_s.n.e 'gnaye sva_ha_; 5.5.12:…dha_tuh; sarasvatyai s'a_rih s'yeta_ purus.ava_k, sarasvate s'ukah s'yetah purus.ava_g, a_ran.yo 'jo nakula_ s'aka_ te paus.n.a_ va_ce…; MS 1.10.5 (145.16): sarasvaty eva sr.s.t.a_su va_cam adadha_t pu_s.an.am pratis.t.ha_m abhy asr.jyanta; va_vai sarasvati_, pas'avah pu_s.a_; Abr. 2.24.5: indrah pu_s.an.va_n, indrah sarasvati_va_n)…Goat and sheep-rearing flourished in the mountains of Afghanistan. Pu_s.an's chariot is drawn by goats and he weaves the woolen garment for the sheep. As the goat is sacred to Pu_s.an so is the ewe, mes.i_, sacred to Sarasvati_ at least in the ritual. (TS 2.1.2.6; S'Br 13.2.2.4; a ram in the Sautra_man.i_; TBr. 2.6.15.1).

The R.gvedic period is familiar with the sheep-rearing in Gandha_ra, at the Sindhu and perhaps also at the Parus.n.i_. (Pischel and Geldner, *Vedische Studien*, II, p. 210). RV 1.126.7, the only passage which is more significant speaks of sheep-rearing, mentions a woman "who is hairy like the ewe among the Gandha_ris" (Zimmer, H., *Altindisches Leben*, pp. 30 ff., 229)…But the Sarasvati_ of Arachosia alone does not hold good for the entire RV. It is likely that the memory of this home of the Vedic clans is preserved in some single passages of the Bra_hman.a literature as well. But already the seventh book takes us to other surroundings, to the banks of the holy river in the inner India. (RV 7.96.2: 'When the Pu_rus seize both the andhas (on your banks) by force, then, you radiant one, be merciful to us as the friend of the Maruts and direct the favour of the mighty ones towards us'.(Geiger, *Ostiranische Kultur im Altertum*, p. 364 ff.)
AV 6.30.1:

> **deva_ imam madhuna_ samyuitam yavam sarasvatya_m adhi man.a_v acarkr.s.uh**
> **indra a_si_t si_rapatih s'atakratuh kina_s'a_ a_san marutah suda_navah**

The gods sowed at the Sarasvati_ barley mixed with honey over an amulet. Indra S'atakratu was the lord of the plough, the abundantly bestowing Maruts were the drivers. [Hillebrandt notes: "Here the stream is closely associated with the Maruts, and this is exactly the case in the R.gvedic verse (RV 7.96.2)…Pu_rus must have extended their territories upto the Yamuna_ and Parus.n.i_…The events described in books III and VII which take place mostly farther in the east on the Parus.n.i_, Yamuna_, Vipa_s and S'utudri_ make it improbable that the Sarasvati_ mentioned in RV 7.95, 96, on the banks of which the Pu_rus dwelt, can still be identical with the Arachotos.").

The reference to goats and sheep should not automatically link Sarasvati_ with Arachosia, Afghanistan, since faunal remains of goats and sheep have been found in the region close to Parus.n.i_, in North-West India, Rajasthan. It may not be necessary to postulate two Sarasvati_'s to explain the contextual references in Book VI and Book VII. The rationale for identifying Haraqaiti (arachotos) as the earlier, western Sarasvati_ is based on very flimsy grounds of rearing of sheep in Afghanistan. It would appear that sheep were reared in North West India, Rajasthan as well. Close to Parus.n.i_, in the Markanda valley, a lot of faunal material, dated as early as to the Pleistocene period, has

been recovered from the Upper Siwaliks in general and the neighbouring areas in particular Mention has been made of frequent occurrence, about 2.48 million years ago, of *stegodon insignis ganesa, archidiskodon planifrons, elephas hysudricus, equus sivalensis, rhinoceros sivalensis, R. palaeoindicus, Sus spp., camelus sivalensis, cervus spp., colossochelys atlas, geoclemys sivalensis, crocodylus spp.* and a host of other new forms (Badam, G.L., *Pleistoceene Fauna of India*, Pune, Deccan College; S.N.Rajaguru and G.L. Badam, Late Quaternary Geomorphology of the Markanda Valley, Himachal Pradesh, in: B.P. Radhakrishna and S.S. Merh, eds., *Vedic Sarasvati*, 1999, Bangalore, Geological Society of India, p. 149). An alternative view is that the word Harakhaiti or harahvaiti itself traveled from India to Afghanistan, with the linguistic change of 's'a, sa and s.a' to 'ha', "as we proceed from the traditional region of Madhya des'a towards the west. To take only a couple of instances even now Sa_dhu is pronounced as Hau, S'ivaji as Hibji, Sukhdeva as Hukhdeva, Das'a as Daha and Sa_huka_ra to Hauka_ra in dialects of Marwar…The same process operated in the evolution of S'aryqan.a_ in the R.gveda later to Harya_n.a_…The consistent operation of this linguistic process of the replacement of sibilants by "Ha" thus justifies the conclusion that the name Sarasvati_ also logically underwent the same process in its westward journey and became Harahvaiti or Harkhaiti in Arachosia." (O.P. Bharadwaj, *Studies in Historical Geography of Ancient India*, Delhi, 1986, pp. 176-191; cf. *Vedic Index*, II, 364). The place name spelt as Taus.a_yan.a by Pa_n.ini changed to Tohana at some later stage. (V.S.Agrawal, 1974, *India as known to Pa_n.ini*, 2nd edn., Varanasi, p. 74). So, too the changes from asura to ahura (Isaac Taylor, 1980, *The Origin of the Aryans*, Reprint, Delhil, pp. 184-186). and Sindhu to old Persian Hindu (V.S. Agrawal, V.S. 2011, *Bharata ki maulika ekata_* (Hindi), Allahabad, p. 30f; Tola Frernando and Dragonetti Carmen, 1986, India and Greece before Alexander, *ABORI*, vol. LXVII (pts. I-iv), pp. 159-194).

The identification of the Vedic Sarasvati River with the Indus or its tributaries on the right bank such as Argandab is erroneous because in the Vedic texts, the upper course of Sarasvati is detailed as located between S'utudri_ in the West, a tributary of Beas (as also attested in a R.gvedic su_kta.) and Yamuna in the East, once upon a time; the Sarasvati river is also associated with the Maruts and close to a desert.

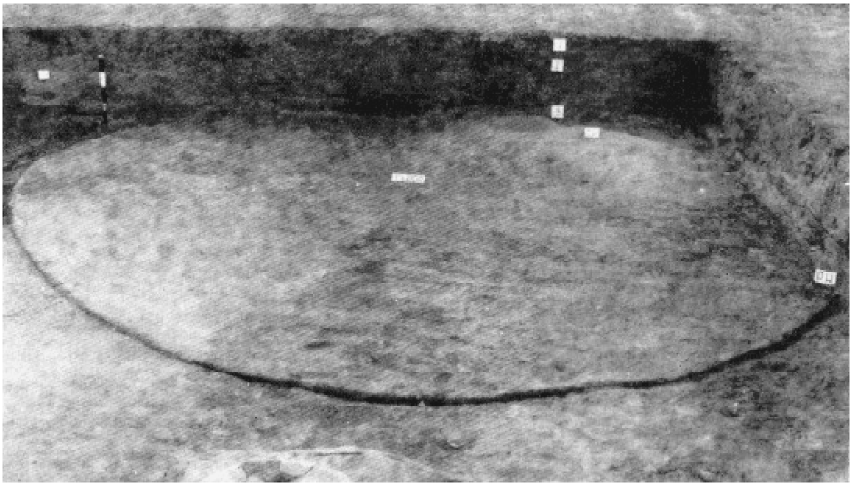
Reminiscing

There is a Sarasvati River running parallel to River Banas and joining the Little Rann of Kutch. There is a Sarasvati River joining the River Luni near Pushkar, Ajmer. There is a Sarasvati (Haraqaiti) in Afghanistan, a tributary of the River Kubha. All these rivers may have been so-named reminscing the days of the civilization days of the Ghaggar-Hakra-Nara wadi's which constituted the Sarasvati River joining the Arabian Sea near Lothal.
That Sarasvati was a more important river than the Sindhu may be noted from the following observations of John Marshall (1931, pp. 1-6): "(Mohenjo-daro) stands on what is known locally as the 'The Island'-a long, narrow strip of land between the main river bed and the Western Nara lop, its precise position being 27.19N by 68.8E, some 7 miles by road from Dokri... Twelve centuries ago, when the Arabs first came to Sind, there were two great rivers flowing through the land: to the west, the Indus: to the east, the Great Mihran, also known as the Hakra or Wahindah. Of these two rivers, the eastern one seems to have been the more important... Major Raverty, the foremost authority on the subject, concluded that at the time of the Arab invasion the main channel of the Great Mihran flowed a line roughly coincident with the existing Eastern Nara canal, which was once an important rive rbed (i.e. it passed close by the city of Alor...flowed...west of Umarkot, and so the Rann of Kutch (then an estuary of the sea) and by the Kori creek to the Arabian Sea. Cf. Raverty, The Mihran of Sind, and its tributaries, JASB, Vol. LXI, 1892, pp. 156-508). According to him, the terminal course of the Indus, which flows by Mohenjo-daro, was then a subsidiary branch of the Mihran, buts course was not the same as at prsent... the existence of two important Chalcolithic sites of Mohenjo-daro and Jhukar, the one in the near vicinity of the Indus, the other of the Western Nara loop..."

"Griffin Vyse recalls observations that Alexander the Great had also sailed to the great lake and to the sea by this 'eastern branch of the Indus'...'the eastern or greater arm of the Mikran described by Rashid-ud-deen as branching off from above Mansura to the east, to the borders of Kutch, and known by the name of Sindh Sagara (Elliot, Vol. I, p. 49). This ancient river is also identical with the Sankra Nala which was constituted by Nadir Shah the boundary between his dominions and those of the Emperor of Delhi."

Lous Flam notes that with the increase in water flow, there was a shift of the Indus River eastward, flooding many settlements and burying them with silt. The Mohenjodaro mounds, were, however, not affected by this swing because of the locationh of the mountds on higher ground. (Louis Flam, 1991, Fluvial geomorphology of the Lower Indus Basin (Sindh, Pakistan) and the Indus

Civilization, in: *Himalayas to the Sea: Geology, Geomorphology and the Quaternary*, John F. Shroder, Jr., ed., London, Routledge, 265-87).



Valabhi, Nesadi (Gujarat): circular kuba or dango with rammed floor; a broken dish lies outside it (After R.N.Mehta, 1984, Pl. 83).

There is no archaeological or linguistic evidence to assume a dichotomy between the Vedic society and the Harappan cultural style.

his'uwa festival of the Hurrians (similar to the vis-uwa in ancient India to celebrate the solstice?)

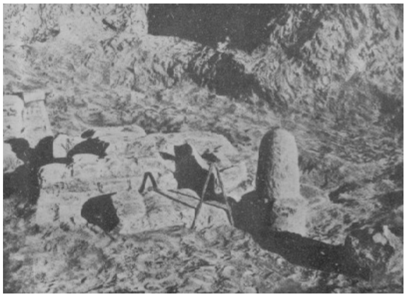
"We are told that the chief scribes of UR.MAH.LU, already mentioned as a member of one of these (scribal) families, received orders from queen Puduhepa to search for tablets of Kizzuwatna and produced copies of the ritual for the **his'uwa** festival as a result...There is a great number of Hurrian gods mentioned in Hittite texts, and many of these are descriptions of cult festivals. Since most texts are fragmentary and, therefore, cannot be dated exactly, we only pick a few significant examples. The texts for the **his'uwa** festival have just been mentioned. Most revealing is a prayer of king Muwatalli. Already in the invocation of the main gods at the beginning of the text, Hebat occurs. The king then asks the bull S'eris' to intercede for him, and calls him 'Bull of the Weathergod of Hatti', which means that this Hurrian bull had entered the circle of the gods of the capital." (Guterbock, H.G., The Hurrian Element in the

Hittite Empire, in: Hoffner, Jr., Harry A. (ed.), ***Perspectives on Hittite CIvilization: selected writings of Hans Gustav Guterbock***, Chicago, Oriental Institute of the University of Chicago, 1997).

Section 7 River Sarasvati: celebrated as Goddess Sarasvati

Heritage of Sarasvati_ : the very fountain-head of the culture of Bha_rat

Sarasvati_ is identified with deeply ingrained cultural traditions of Bha_rat, which provide a lead to determine the locus and course of the River Sarasvati adored in the R.gveda.

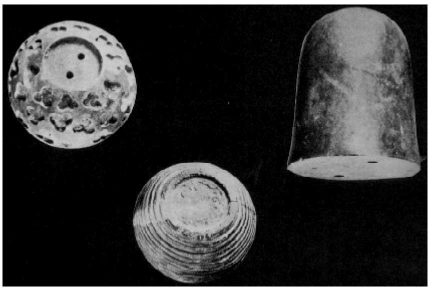


There is conclusive archaeological evidence from Harappa and Mohenjodaro that S'iva or Rudra worship was in vogue in the proto-historic periods. There are also indications that mother goddess worship was also practiced.

Harappa: stone lingam in situ in trench Ai, Mound F (Vats, M.S., 1940, Plate X.c). The lingam was discovered 5 ft. 6 in. below the surface. It measures 11 in. high and 7 3/8 in. dia. at the base and is rough all over.



Many specimens of lingas were found both at Mohenjodaro and at Harappa. "In shape they are like many of the lingas seen in S'iva temples to-day, and have been taken to be such by most of the Hindus who have seen them." While discussing the lingams as characteristic of S'aivism, Marshall provides this example of a miniature linga worn as an amulet. (Marshall, 1931, p. 58-63; pl. XIII.13)



Vats, however, notes "...(No.42 (11806) in pl. LXXXIII...I take to be a lingam. Its shaft is holed

through and etched round with trefoil patterns in white, and a quatrefoil rosette at the base...”(Vats, M.S., 1940, p. 371). The trefoil motif on the lingam is significant in the context of a base found with trefoil motifs in another context.Mohenjodaro: stone (?) lingam and two decorated bases These examples clearly show tthe trefoil designs on the bases which have two holes in the center of the top to fix in the lingam, which also has corresponding two holes; perhaps, the lingam was fixed to the base by structural supports through the two holes.(Illustration after Bridget and Raymond Allchin, 1982, *The rise of civilization in India and Pakistan*, Cambridge University Press, Fig. 8.18).



Harappa: terracotta bust of mother goddess figurine; she wears three flowers in the head-dress which is fan-shaped; she wears a tight necklace round the neck and a longer one hanging between the breasts; 3.2 in. high. Cemetery H, Eastern Section, Square S 34/9, Stratum I (Vats, M.S., 1940, Pl. LXXVII.38). It is notable that this figurine has been found in Cemetery H. Similar figurines hav e also been found in the Great Granary area and other inhabited areas. This lends credence to the deification of mother and consistent with the belief system of the Harappans which is a legacy nurtured in Hindu Bharat, even today, as a continuation of the Harappan cultural tradition.



Mohenjodaro: terracotta mother goddess. Four flowers adorn the front part of the fan-shaped headdress which has two cups on either side (apparently to contain oil and function as a wick lamp); the idol is ornamented with a three-strand choker with pendants; a two-stranded necklace with a central disc

pendant; a three-stranded waist belt with disc-shaped studs. (Harappa; 13.2 cm. High; Karachi National Museum HP 1603; After Kenoyer, J.M., 1998, cat. No. 133, fig. 1.7).

Mohenjodaro: copper/bronze statue; female figure stands 13.2 cm. all, with left arm on hip and right hand holds a small bowl in front of the waist. The hair is tied in a horizontal bun hanging low on the back of the neck; traces of long, almond-shaped eyes are visible; many bangles adorn the left arm and a few bangles are seen above the right elbow. (DK 12728; Karachi National Museum. NMP 50.883; Mackay, 1938, 274, pl. LXXIII, 0-11; After J.M. Kenoyer, 1998, cat. No. 144, Fig. 7.24). The cup might have held oil for a lamp, indicating it as the earliest example of a deification of the image.



Mother and child with attendants, ca. 8th cent., Pala dynasty. The inlay at the top, middle of the panel includes sapta ma_tr.ka_ (seven mothers), Vina_yaka, Ka_rttikeya carrying a trident and sword and a s'iva lingam. This is a superb example of the tradition of mother goddess celebrated as a cultural heritage of the Sarasvati Civilization of the bronze age.



Sarasvati_ is associated with the remembrance of the departed souls (pitr. tarpan.am or homage to ancestors), who had established the cultural traditions living as they did on the banks of the River Sarasvati, the peacock which is a native of the River Basin and plaks.a tree, which is the source of the River Sarasvati in the Himalayas.

To lengthen out someone’s life:

> **pra_n.ena_gne caks.us.a_ sam sr.jemam sami_raya tanva_ sam balena**
> **vettha_mr.tasya ma_ nu ga_nma_ nu bhu_migr.ho bhuvat**

AV 5.30.14 With breath, O Agni, with sight unite him; associate (sami_ray) him with body, with strength; thou understandest immortality; let him not now go; let him not now become one housing in the earth.

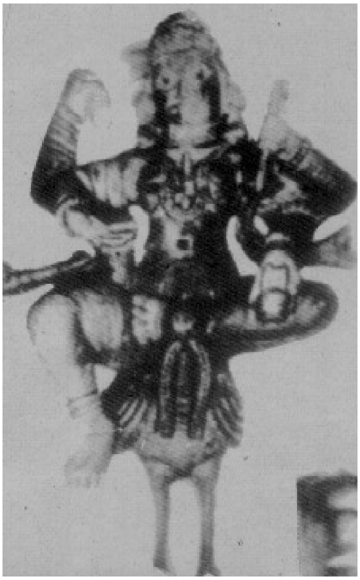
> मो षु वरुण मृन्मयं गृहं राजन्नहं गमम् ।
> मृळा सुक्षत्र मृळय ॥

RV 7.089.01 May I never go, royal Varun.a, to a house made of clay; grant me happiness, possessor of wealth, grant me happiness. [May I never: mo s.u gr.ham mr.n.mayam gamam: (implied) tvadi_yam, your; s.u he = sus'obhanam suvarn.amayam, very handsome, made of gold; s.u = but to your beautiful house, i.e. one made of gold; grant me happiness: mr.l.aya = show mercy].

If this r.ca is a reference to pot-burial, there is archaeological evidence for this practice both at Harappa and Kalibangan. Three types of burials have been reported from cemetery H area in Harappa: extended inhumation burials in the lower levels of the stratumII and fractional earth-burials in the upper levels of the same stratum (Harappan) apart from jar-burials of Stratum I (Post-Harappan). The jar-burials contained selected bones of adults or children or both. Post-cremation burials have also been reported by Vats in Stratum V of AB Mound. He exposed 176 urns from the habitation area and 51 jars from Stratum I of “B area’ of Cemetery H. Some of them contained charred bones and charcoal. Vats observes that ‘the overwhelming number of females among jar-burials some of which are accompanied by infants (unborn babies) indicates probably an adult variant of the custom of cremation resorted to in the case of

abnormal or unnatural deaths of women.” (Vats, M.S., 1940, I 16, 174-179, 251-274). A type of disposal of the dead reported in Kalibangan was a pot-burial without skeletons. (B.K.Thapar, 1979, Kalibangan, A Harappan metropolis beyond the Indus Valley, Possehl, G., ed., *Ancient Cities of the Indus*, New Delhi, Vikas, 202).

Sarasvati_ is the mighty flood (RV 1.3.12) and sindhu ma_ta_, mother of streams. Sarasvati_ is associated with the rainy season and autumn. (S’B 12.8.2.34). When a reference is made to Seven Sisters of Seven Mothers, there is also an association with the rivers or sacred streams. (RV 1.72.8; 8.85.1; 9.86.36; 9.102.4). Seven sisters bear the names of cows (RV 1.164.3). Seven sisters are invoked, together with seven peacocks (peahens) as a charm against poison or snake-bite (RV 1.191.14). [The cow inviolable (aghnya_) is associated in the Yajus. with Sarasvati_, Id.a_, Mahi_, Ranta_, Havya_, Ka_mya_, Candra_, Jyoti, Aditi and Vis’ruti (VS 8.43; S’B 4.5.8.10)].



त्रिः स॒प्त म॑यू॒र्यः॑ स॒प्त स्वसा॑रो अ॒ग्रुवः॑ ।
तास्ते॑ वि॒षं वि ज॑भ्रिर उ॒दकं॑ कु॒म्भिनी॑रिव ॥



1.191.14 May the thrice-seven peahens, the seven-sister rivers, carry off,(O Body), your poison, as maidens, with pitchers, carry away water. [Thrice-seven peahen: tri saptamayu_ryah, an allusion to the enmity between peafowl and snakes; 31 varities of mayuri_ or peahen; the seven rivers are those of heaven, or the branches of the divine sarasvati_ or gan:ga_; all running streams are possibly regarded as antidotes].

This may explain the association of Sarasvati_ with the peacock. It is possible that with the semantics of marak = peacock, death, and the belief of peacock acting as the carrier of the spirit to heaven, the association with Sarasvati_ as the river where pitr. tarpan.a (homage to ancestors) is offered reinforces the association of theSarasvati_ river which nurtured the sages of the Vedic times

on ashramas located on the banks of the sacred river. The bird is called s'iti kan.t.aha and associated with Rudra-S'iva and Skanda (Kosambi, D.D., *Myth and Reality*, pp. 75-76). In some images of Sarasvati_, the figures of dogs are also painted, perhaps representing Yama's dog. It is noted that in South Indian iron age burials, the site is oriented towards the south, the direction of Yama. (Indira S. Aiyar, *Durga_ as Mahis.a_suramardini, a dynamic myth of goddess*, Delhi, Gyan Publishing House, 1997, p. 97).

Sarasvati_ riding on a peacock; she holds a lotus in the right upper hand and a manuscript in the left upper hand; lower left hand is mutilated (perhaps carried a kaman.d.alu). Baya_na_, Bharatpur.

[**Funeral Verses**]

> **sarasvati_ devayanto havante sarasvati_madhvare ta_yama_ne**
> **sarasvati_ sukr.to havante sarasvati_ da_s'us.e va_ryam da_t**
> **sarasvati_ pitaro havante daks.in.a_ yajn~amabhinaks.ama_n.a_h**
> **a_sadya_sm in barhis.i ma_dayadhvamanami_va_ is.a a_ dhehyasme**
> **sarasvati ya_ saratham yaya_thokthaih svadha_bhirdevi pitr.bhirmadanti_**
> **sahasra_rghamid.o atra bha_gam ra_yaspos.am yajama_na_ya dhehi**

AV 18.1.41-43, 18.4.45-47 On Sarasvati_ do the pious call; on Sarasvati_, while the sacrifice is being extended; on Sarasvati_ do the well-doers call; may Sarasvati_ give what is desirable to the worshipper (da_s'va_ns).

On Sarasvati_ do the Fathers call, arriving at the sacrifice on the south; sitting on this barhis do you revel; assign you to us food (is.as) free from disease.

O Sarasvati_, that went in company (saratham) with the songs (uktha_), with the svadha_s, O goddess, reveling with the Fathers, assign thou to the sacrificer here a portion of refreshment (id.) of thousandfold value, abundance of wealth.

Kunal: early Harappan pottery, peacock and pipal designs



The depiction of peacock motifs on the Harappan funerary pottery is significant, considering that peacock is associated with Sarasvati_ as her va_hana in later-day iconography and other art forms. It is also notable that the Sarasvati river has many ghats where pitr. tarpan.a (homage to the ancestors) is offered (e.g. Sarasvati_ ghats and Brahmayoni in Pehoa, Pr.thu_daka near Kuruks.etra); Balarama's pilgrimage along the banks of the Sarasvati River described in the s'alya parvam of the Maha_bha_rata also includes the homage to ancestors offered by Balarama at many pilgrimage sites, e.g. Camasobheda, na_gobheda, s'ivobheda, ka_ra_pacava, plaks.apras'ravan.a

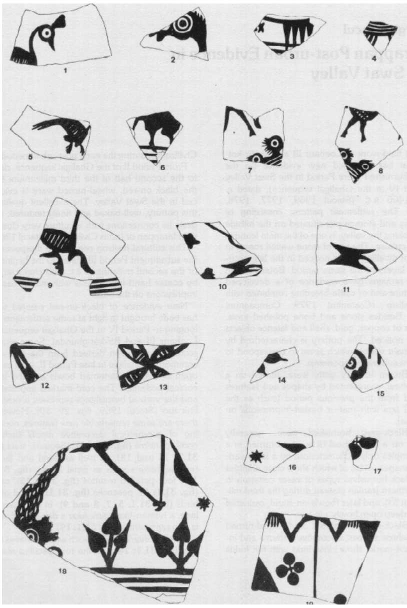
A. Cunningham notes that the name of the town Pr.thu_daka (modern Pehoa on the banks of Sarasvati_ river, near Kuruks.etra) is a derivation: "The place (mentioned by Hieun Tsang in his travels ca. 640 AD as Pehoa) derived its name from the famous Pr.thu-Chakravarti, who is said to have been the first person that obtained the title Ra_ja…On his (Pr.thu's father Vena's) death Pr.thu performed the s'ra_ddha, or funeral ceremonies, and for twelve days after the cremation he sat on the bank of the Sarasvati_ offering water to all comers. The place was therefore called Pr.thu_daka or Pr.thu's pool, from daka or udaka water; and the city which he afterwards built on thje spot was called by the same name. The shrine of Pr.thu_daka has a place in the Kuruks.etra Maha_tmya, and is still visited." (A. Cunningham, 1924, *The Ancient Geography of India*, Calcutta: p. 365).

Atharvaveda (8.10.24 Extolling the vira_j, refers to Pr.thu son of Vena):

> "She ascended; she came to men; men called to her: O rich in cheer, come! Of her Manu son of Vivasvant was young, earth (was) vessel; her Pr.thi_ son of Vena milked; from her he milked both cultivation

(kr.s.i) and grain; upon these two, both cultivation and grain, men subsist; successful by what is cultivated (kr.s.t.a), one to be subsisted upon, becometh he who knoweth thus."

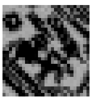
In this hymn, Pr.thu is introduced as the originator of the art of ploughing and cultivation and the evolution of agriculture as a process of turning pastoral groups into husbandry, an implied reference to tooling the people with the bronze implements and tools, such as ploughshare, sickle and axe/adze needed for agricultural activities.



tatah kuma_rama_da_ya deva_ brahmapurogama_h abhis.eka_rthama_jagmuh s'ailendram sahita_statah pun.ya_m haimavati_m devi_m saricches.t.ha_m sarasvati_m samantapan~cake ya_ vai tris.u lokes.u vis'ruta_ (MBh. S'alya 43.50,51).

ba_n.o na_ma_tha daiteyo balaih putro maha_balah kraun~cam parvatama_sa_dya devasandha_naba_dhata tamabhyaya_nmaha_senah suras'atrumuda_radhi_h sa ka_rkeyasya bhaya_tkraun~cam s'aran.ameyiva_n tatah kraun~cam maha_manyuh kraun~cana_danina_ditam s'aktya_ bibheda bhagava_nka_rtikeyognidattaya_ (MBh. S'alya 45.71-73).

Funerary practices: archaeological evidence



Kenoyer (1998, p. 175) points to a spectacular form depicted on cemetery H pottery of Harappa as an example of the emergence of a new social order in continuation of the Harappan culture; the form is a ligature: bull's body, antelope horns and a human head and torso, with hands resting on the hips and arms covered with bangles. (The motif is from Vats, M.S., 1940, Plate LXII). Cemetery H pottery and related ceramics have been found throughout northern Pakistan, even as far north as Swat. (Giorgio Stacul,

1984, Harappan post urban evidence in the Swat valley, in: B.B.Lal and S.P. Gupta, eds., eds., *Frontiers of Indus Civilization*, New Delhi, Books and Books,: 271-76).

Swat valley:Bir-kot ghundai: painted pottery (After Giorgio Stacul, 1984, Fig. 31.1). “From Period II of the Ghaligal sequence, dated to the second half of the third millennium BC, the black-on-red, wheel-turned ware is evidenced in the Swat Valley. The excellent quality of this pottery, well-baked and finely textured, suggests its connections with a culture very close to the Harappan or Indus civilization.” (Giorgio Stacul, 1984, p. 271). The notable comparable motifs are: 1. peacock; 18. three pipal leaves of a branch.

Burials were inhumation in round or oval pits with funerary goods (pottery, food, clothes, ornaments, tools). On occasions, pot or basin (camu_) was used.

The presence of grave offerings is a remarkable reflection of the belief of the people in life after death. Typical grave goods were the pottery similar to those used in the home.

Mortimer Wheeler (1946) recovered fragments of wood from a coffin and shroud in a burial site. The wood and shroud were identified as rosewood (dalbergia latifolia) and cedar (cedrus deodara). (Chowdhury, K.A. and Ghosh, S.., 1947, Plant remains from Harappa, 1946, *Ancient India 7*, 3-19).

iru_l., iruvil. = dalbergia sisu; i_t.t.i = blackwood, dalbergia latifolia (Ta.)(DEDR 483).

nu_kku sissoo wood (Ta.)(DEDR 2721).
nu_xna_ = to bow (the head)(Kur.)(DEDR 3723).

Burials were often accompanied by grave offerings of sacrificed animals, ornaments and/or tools at Mehrgarh, Pakistan, which is a Neolithic period site dated ca. 6500-4500 BC. (Pascal Sellier, 1989, The contribution of paleoanthropology to the interpretation of a functional funerary structure: the graves from Neolithic Mehrgarh Period 1b in: *South Asian Archaeology, 1989*, Catherine Jarrige, ed., Madison, Wisc., Prehistory Press, 1992, 253-66; Jean Francois Jarrige, 1985, Continuity and Change in the North Kachi Plain (Baluchistan, Pakistan) at the Beginning of the Second Milklennium BC, in:

Jamine Schotsmans and Maurizio Taddei, eds., *South Asian Archaeology, 1983*, Naples, Istituto Universitario Orientale, 35-68).

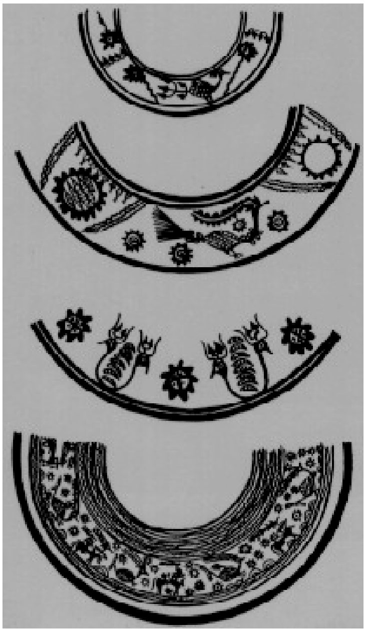
Cemetery R37 and a later cemetery called cemetery H were discovered at Harappa. R37 is composed of one stratum with evidence of continuous use. ‘The body was extended occasionally on one side or the other with the head to the north.” The grave goods were generally kept near the head or feet of the body. The number of pots averaged 15 to 20. Typical personal ornaments were: copper ring on the finger of right hand, two steatite necklaces, anklets of paste beads, earring of thin copper wire, shell bangles, copper mirror, mother-of-pearl shells, antimony stick, large shell spoon, and steatite beads. On one burial site, a small handled lamp was also found at the feet of the skeleton. In one unique burial, apart from 37 pots, a plain copper ring on the middle finger of the right hand, shell ring to the left of the head and two to the left shoulder, traces of a wooden lid were found ‘on the sandy material immediately overlying the skeleton’. One burial site with two pots, had mud-brick lining around the body and a heaped mud-brick filling at the southern end of the grave. (*Ancient India*, no.3, 1947, p. 87; Wheeler, The Indus Civilization, 1968, p. 67).

The Cemetery H in Harappa was later than cemetery R37 and had two strata. Stratum I (later period) had pot-burials without any grave goods. The painted motifs on pottery: a human shape is drawn on the body of the peacock or a bird, amidst stars and leaves. Sometimes, the body is flanked by two animals (bulls?) with long horns and secured with a rope held by the human figurfe. One of the animals is attacked by a dog. Stratum II (earlier period) showed skeletons flexed or stretched with grave goods at the head and feet. In both strata, the burial jars and related pottery are distinctively shaped and painted with typical Harappan designs and decorations. The pottery in Statrum II burials were red-ware with black paintings.

Two types of burials were found at Kalibangan: extended inhumation and pot burial. In the first type, in an oblong pit, the skeleton was found in an extended position with its head to the north. The grave goods were similar to those in Harappa R37: in one case, a copper or bronze mirror was found. In the second type (pot burial), the pit was oval or circular and together with other pots (from four to twenty nine) containing grave goods. Some pits also had beads, shell bangles and steatite ornaments. No skeletal remains or pots were found inside the urn. One grave was rectangular (like a camu_), lined on all sides with mud-

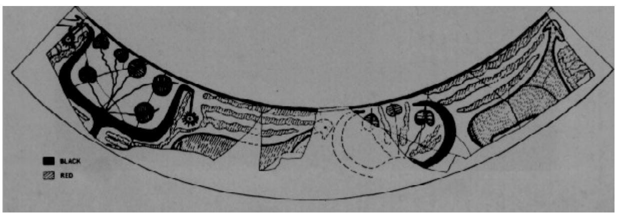
bricks set in thick mud plaster. The grave goods were: 72 pots; the head was to the north. (*Indian Archaeology, A Review*, 196364, pp. 38-39; ibid., 1964-65, pp. 38-39; ibid., 1967-68, p. 45; 1968-69, p. J-74-1-75).

At Rupar, many graves were circular or oval and contained grave goods with pots numbering 4 to 26; one burial resembled a clayh coffin or a clay basin which the skeleton rested (like a camu_ described in the S'atapatha Bra_hman.a). (Indian Archaeology, A Review, 1954-55, pl. VIIA). Malati J. Shendge notes that the oval or circular shape of graves is paralleled at Ur and even an oval coffin of clay is reported. C.Leonard Woolley, *Ur Excavation*, Vol. II, London, 1934, pl. II; loc.cit. Malati J. Shendge, *The Civilized Demons*, Delhi, Abhinav Publications, 1977, p. 274).



The keynote motif of the decoration on funeral pots is the depiction of a peacock or a highly stylized bird, with horns: Cemetery H pottery motifs, after Vats 1940, Pl. LXII [The typical motifs are: humped bull, gazelle, flying peacocks, double serpants with a horned headdress which has two papal leaves sprouting from the center; humped bulls with three papal leaves sprouting from the middle of the forehead, flying peacocks with antelope horns or a five-pronged tail made of papal leaves. 'One spectacular form combines a bull's body, antelope horns and a human head and torso, with hands resting on the hips and arms covered with bangles." (After Kenoyer, opcit., 1998, pp. 174-175, fig. 9.3; Madho Sarup Vats, *Excavations atg Harappa*, Delhi, Govt. of India Press, 1940, Pl. LXII.13].

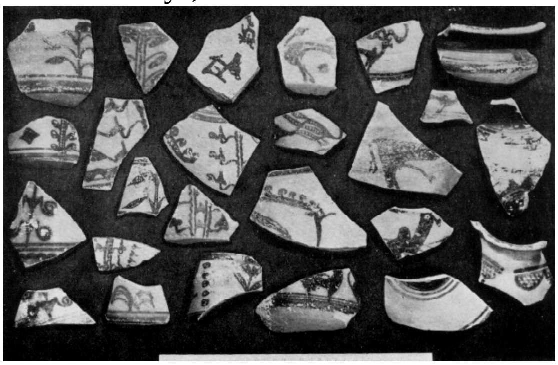




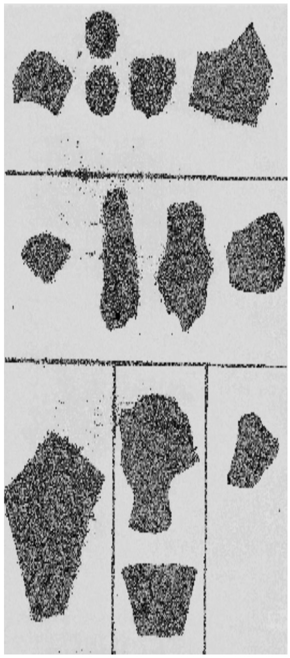
Chanhudaro; a large storage jar painted with peacock motifs

(After Mackay, E.J.H., 1943, *Chanhu-daro excavations 1935-36*. New Haven: American Oriental Society, American Oriental Series, Vol. 20,: Frontispiece, drawn from Fairservis, W.A. Jr., 1971, The Roots of Ancient India, New York, Macmillan,: Fig. 62).

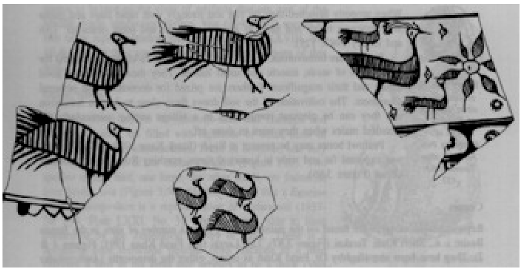
Lewan, Bannu basin: painting on a bowl; note the circle and dot motif, leaves and horns. (After F.A.. Durrani, Some early Harappan sites in Gomal and Bannu valleys, in: B.B.. Lal and S..P. Gupta, eds., *Frontiers of Indus Civilization*, 1984, Fig 51.2: bowl with mountain goat, bull and buffalo's head and papal leaves).



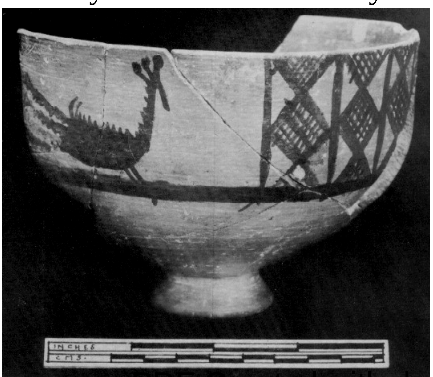
Lurewala, Shahiwala, Kudwala: cemetery H material from high mounds with peacock, humped bull and leaf motifs.



Chanhu-daro. Painted pottery with peacock motifs (After Mackay, 1943: Pl. XXXII, Nos. 4,8&9).



Peacock in plumage is also represented on a terracotta figurine of Harappa. (Vats, 1940, Pl. LXXVIII, 14; Pl. 3.29). The peafowl (*pavo cristatus*) is normally found in the vicinity of streams along moist and dry desiduous forests and outskirts of human settlements and cultivated land.



Rangapur: bowl painted with peacock (After S.R.Rao, *Dawn and devolution of*

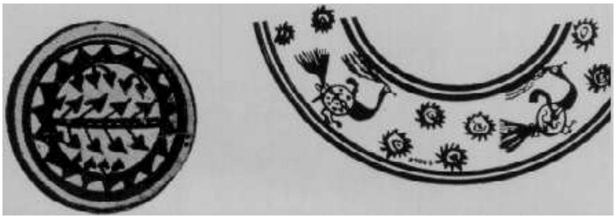
Indian civilization, 1991, Delhi, Aditya Prakashan, pl. xx)

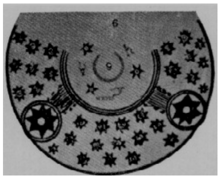
Painted motifs from Cemetery H pottery, Harappa [Similar pottery is found at the sites of Lurewala and Ratha Their in Bahawalpur province.



Mohenjodaro: painted storage jar (After S.R.Rao, opcit., 1991, pl. lxxxii).

Piggott, *Prehistoric India*, notes similarities in the star and bird motifs with those on pots of Giyan II cemetery of ca. 1550-1200 B.C.] [M.S. Vats refers to a site names Kot.a_sura which was north-east of Mohenjo-daro, on the right bank of dry Nara; at this site, he found pottery of cemetery H type and well-executed papal leaf motif: M.S. Vats, Explorations in Khairpur State, Sind, *Annual Report, Archaeological Survey of India, 1935-36,* pp. 36-38].

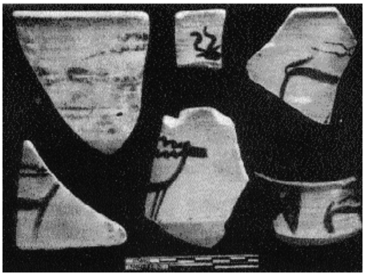




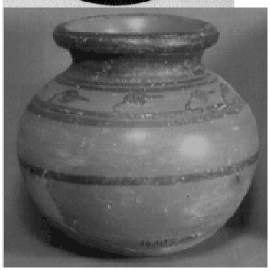
Cemetery H pottery decorated with star motif.



Solar/star motif and leaves around a dotted circle motif in mature Harappan pottery



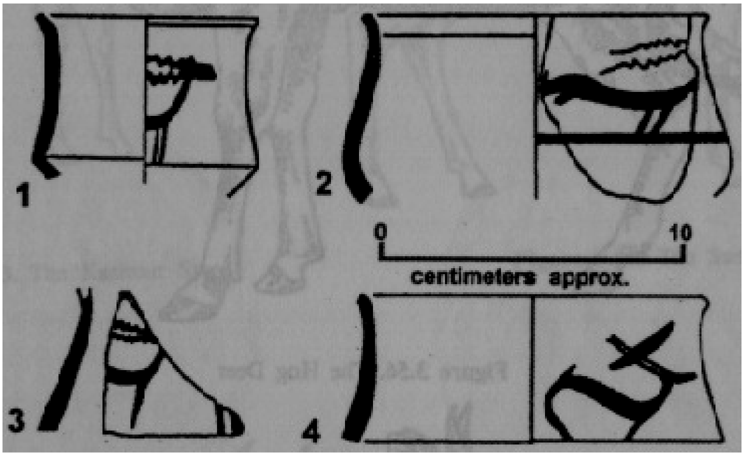
Harappa: Humped bull (?) or black buck antelope, painted on Cemetery H pottery (After S.R.Rao, 1991, pl. XCIII).



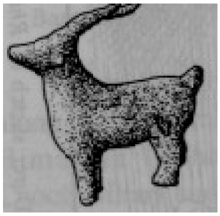


Rangapur: gazelle (or black buck antelope) and bull painted on lustrous red ware (Periods IIC and III) (After S.R.Rao, 1991, pl. XCII).

.Kulli and Mehi; blackbucks and other animals in rows. (After Possehl, 1999, Fig. 3.61, After Stein 1931).



Mohenjodaro; blackbuck? (*antelope cervicapra*) in bronze (After Mackay 1937-38: Pl. LXXVII,1, drawing from Yule 1985: Tafel 2).



Rangpur and Oriyo Timbos (ca. 1600 BC); blackbucks on lustrous red ware (AfterPossehl, 1990, Fig. 3.60; Nos.1-3, S.R. Rao, 1963: fig. 34, Nos. 50,51,53; No.4 Rissman and Chitalwala 1990-: Fig. 18, No.80)

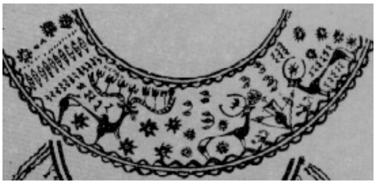


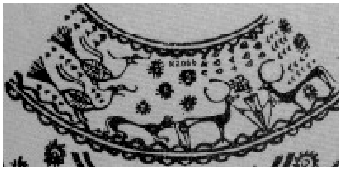
Painted dish or lid from the early levels of cemetery H (design of blackbuck antelope with trefoil design made of combined circle-and-dot motifs, possiblyu representing stars), Harappa, ca. 1900 BC, cat. No. 200; large cremation urn unearthed at Harappa (with flying peacocks and sun or star motifs and wavy lines which may represent water, later levels of cemetery H, ca. 1700 BC, cat.no.201; small painted globular pot associated with cremation urns (leafy vine or banyan leaf design around the neck), ca. 1700 BC, cemetery H, cat. No. 202 (After J.M. Kenoyer, Ancient Cities of the Indus Valley Civilization, Oxford, Oxford Universityh Press, 1998, p. 172, figs. 9.1 and 9.4)). Note the wavy lines, antelope, peacock and peacock feather motifs on the pottery lid and pot.

[Language notes: **mer.go** = rimless (vessels); with horns twisted back; **mer.ha** = twisted, crumpled, as a horn (Santali.lex.); this depiction of the twisted horn, twisted back on the peacock motif and also on the blackbuck antelope motif is apparently a phonetic determinative which is concordant with the lexeme: **marak** – peacock; **marak** is a connotation of 'death'.]



Harappa: burial pot of Stratum I with cover; painting of peacock with antelope horns flowing backwards; Vats, M.S., 1940, pl. LIX.3)





Harappa: painting on burial jar (Vats, M.S., 1940, pl. LXII.1a,b)

"...it is evident that the peacock was regarded with peculiar sanctity in connection with the cult of the dead...the burial jar...is painted in two bands; the lower one with rows of leaves alternating with pairs of stars, the upper one with more elaborate scfenes, seemingly of a mythological character (Pl. LXII, 1, a and b). In the upper band, on opposite sides of the jar, are two similar groups of figures showing a bovine animal—probably a bull—with long, incurving horns on either side of a beaked human human figure who has secured them by the neck with ropes held in hands and under the feet, and who also has a bow and arrow in his left hand. This creature is human but for the beak and wavy lines rising from his head. In the left hand representation (Pl. LXII,1a), the animal on the left is being attacked by a hound which has caught its tail in his mouth. It will also be noticed that the hind quarters of this animal are shown in outline only, while in the right-hand one they are blocked in. Behind the hound are two horned peacocks in fight (Pl. LXII, 1a). The scene evidently proceeds from left to right where the principal, representation is again repeated with some difference (Pl. LXII, 1b). To the right of the left hand scene, that is to say between the two principal representation is a goat of inordinately large size whose enormous horns are ornamented with eight trident-like devices, and whose hind-quarters, like those of the left hand bull, are also shown in outline only. The trident associated with S'iva, whose

prototype has been found at Mohenjodaro, and with other deities, as well as the horns (with which the trident was to become intimately connected), were regarded as emblems of divinity by the Indus people, and it is not unlikely that the supernatural size of this goat and the trident-shaped crests have a similar significance...The rest of the available space is filled with stars, birds, leaves etc...It appears to me that the hound in the left hand scene, may, like the two hounds of Yama...(R.gveda 10.14-10-12)" (Vats, M.S., 1940, pp. 207-208).

Madho Swarup Vats who excavated the Cemetery H at Harappa provides a superb account of the prehistoric burial practices of the people and notes: "...elaborate painting, occurring as it does, on a burial pot is meant to portray what was believed to happen to the dead person there can hardly be any doubt...In connection with the outlined hind-quarters of the goat it is interesting to p;oint out that in R.gveda, 10.16, a funeral hymn addressed to Agni, the deity at the time of cremating a dead body, is thus exhorted in verse 1: "Burn him not up, nor quite consume him, Agni; let not his body or his skin be scattered. O Ja_tavedas, when thou hast matured him, then send him, on his way unto the Fathers." Again in verse 4 of the same hymn Agni is asked in the following words to consume only the goat that was slaughtered and laid limb by limb on the corpse: "Thy portion is the goat; with heat consume him, let thy fierce flame, thy glowing splendour, burn him. With thine auspicious forms, O Ja_tavedas, bear this man to the region of the pious." In the scenes portrayed on this jar the only indication of the slaughter of the goat, as well as of the prototype of the Anustaran.i cow, is afforded by the absence of the entrails, but in view of the verses quoted above there is no doubt that the sacrifice of these animals was intended to protect the person from the fire, whose fury was to be exhausted on the limbs of the goat and presumably also of the bull. Moreover, according to the R.gveda, the duty of Agni (Ja_tavedas) was to mature the dead man and to send him to the region of the pious, or the Fathers, as stated in verses 1 and 4 of the hymn quoted above." (Vats, M.S., 1940, pp. 208-209).

K.N. Sastri endorses the views of Vats: "There can hardly be any doubt that the Cemetery H people believed in the continuity of human life even after death as also in the passage of the soul in diverse forms of animate life and its ultimate access to the Land of Bliss, where there were running streams teeming with fish, majestic shady trees, eternal sunshine and the resplendent aerial region resonant with singing birds. Here soul of the deceased resided in eternal peace and happiness. On its way it had a trackless dangerous zone to cross a treacherous river where there were no boats or ferry men. The journey was

long and perilous and there were no provisions on the way. So the living kinsmen and relatives of the deceased had to prepare a way for the dead by providing him with all sorts of things to facilitate his journey to the unknown world."(Sastri, K.N., 1965, *New Light on the Indus Civilization*, 2 vols., p. 33). This is an echo of belief in life after death in the Yajurveda (Yajus. 35.2-21). Yajus. 35 deals with pitr.yajn~a or yajn~a for the ancestral manes and contains mantras used in funeral ceremonies.

"Begone the pan.is, hence away, rebellious, scorners of the gods! The place is his who poured the juice.
Let Savitar approve a spot upon the earth for thy remains; and let the bulls be yoked for it.
Let Va_yu purify. Let Savitar purify. With Agni's glitter, with Savitar's luster. Let the bulls be unyoked.
The Holy Fig Tree is your home, your mansion is the Parn.a tree; winners of cattle shall ye be if ye regain for me this man.
Let Savitar lay down thy bones committed to the Mother's lap. Be pleasant to this man, O Earth...
Carry the fat to Fathers, Ja_tavedas, where, far away, thou knowest them established, Let the rivulets of marrow flow to meet them, and let their truthful wishes be accomplished. All hail! (sam namanta_m sva_ha_...
Born art thou, Agni, from this man; let him again be born from three, for Svarga's world, the man I name, All-hail (sva_ha_)."

In the Yajus. 35.5, the imagery is vivid: savita_ te s'ari_ra_n.i maturaupasth a_vapatu, tasmai pr.thivi_ s'am bhava: an allusion to the sowing of the remains in the womb of mother Earth for rebirth. A circle of paved stones was laid (as found in the excavated site of Dholavira) as a fortification which could not be trespassed: imam jivebhyah paridhim dadha_mi ma_ es.am nu ga_t aparo artham etam; s'atam ji_vantu s'aradah puru_cih antar mr.tyum dadhatam parvatena (RV 10.18.4; AV 35.15).
South is the direction of the manes (RV 10.14.2; 7) and the dead are placed with their feet southwards. (Wheeler, R.E.M.,1947, Harappa—1946, *Ancient India*, 3: 86; Gupta, S.P., 1972, *Disposal of the Dead and Physical Types in Ancient India*, Delhi, 54-75).

Belief in the svarga is also noted in the R.gveda (RV 10.95.18) apart from the journey to Yamaloka (RV 10l.14-19)

Dogs and funerary rites

There are parallels between funerary rites described in the Avestan and in the R.gveda.

The R.gveda assigns two dogs of Yama to guard the path of the departed soul and to lead the soul to Yama's place.

अपेत वीत वि च सर्पतातो ऽस्मा एतम् पितरो लोकम् अक्रन् ।
अहोभिर् अद्भिर् अक्तुभिर् व्यक्तं यमो ददात्य् अवसानम् अस्मै ॥
अति द्रव सारमेयौ श्वानौ चतुरक्षौ शबलौ साधुना पथा ।
अथा पितॄन् सुविदत्राउपेहि यमेन ये सधमादम् मदन्ति ॥
यौ ते श्वानौ यम रक्षितारौ चतुरक्षौ पथिरक्षी नृचक्षसौ ।
ताभ्याम् एनम् परि देहि राजन् स्वस्ति चास्मा अनमीवं च धेहि ॥
उरूणसाव् असुतृपा उदुम्बलौ यमस्य दूतौ चरतो जनाअनु ।
ताव् अस्मभ्यं दृशये सूर्याय पुनर् दाताम् असुम् अद्येह भद्रम् ॥

10.014.09 Depart from hence, begone, go far off, (evil spirits); the Pitr.s have assigned this place to him, yama has given him a place of cremation consecrated by days, streams and nights. To him-- (the departed worshipper].
10.014.10 Pass by a secure path beyond the two spotted four-eyed dogs, the progeny of Sarama_, and join the wise Pitr.s who rejoice joyfully with Yama. [sa_rameyau... sarama_ na_ma ka_cit devas'uni_ tasya_h putrau].
10.014.11 Entrust him, O king, to your two dogs, which are your protectors, Yama, the four-eyed guardians of the road, renowned by men, and grant him prosperity and health. [Renowned by men: i.e., renowned in the Vedas, law-books and Pura_n.as].
10.014.12 The messengers of Yama, broad-nosed, and of exceeding strength, and satiating themselves with the life (of mortals), hunt mankind; may they allow us this day a prosperous existence here, that we may look upon the sun.

[May they allow...the sun: or, may they now restore to us that fair life to look upon the sun (still speaking of the departed worshipper)].

Yama had, thus, traversed many water-courses yielding way for many. Yama's two sa_rameya dogs (sa_rameyau s'va_nau) have four eyes, spots and broad noses. The sa_rameya dogs protect the path. Among the Cananites, the legend is that Yamm, who also had two messengers, was a sea-god who was succeeded by Baal as the king of gods. (Martin Haug, *Aitareya Bra_hman.a* 6.15, p. 275).

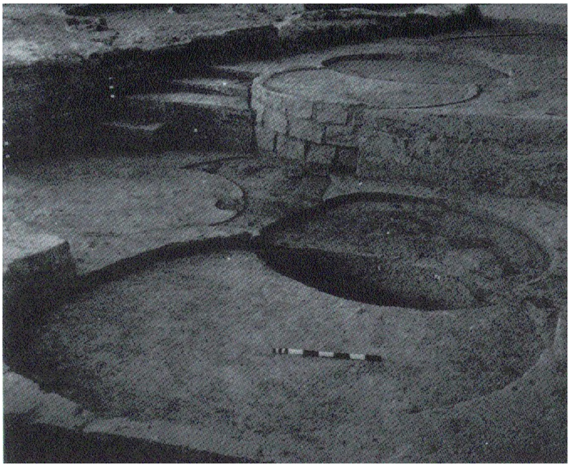
Vendidad Fargard (13.2 ff.) describes a dog as a creature of good spirit. The rite is called Sag-did. A yellow dog with four eyes, i.e. two eyes and two spots above the eyes, or a white dog with yellow ears (Fargard 8.3.16) is brought close to the dead. This is to make the Druj Na_su to fly away.

Another legend is recounted in the Great Epic. S'iva fires a fire missile to burn down Tripura or three cities of the asuras built by the architect Maya and S'iva throws the destroyed metallic cities into the Western Ocean. Sarasvati_ river provided the track for S'iva's chariot.

> **trailokyasa_ram tamis.um mumoca tripuram prati**
> **Tatsa_suragan.am dagdhva_ pra_ks.ipatpas'cima_rn.ave (MBh. Karn.a 5.120).**
>
> **karma satyam taporthas'ca vihita_statra ras'mayah**
> **Adhis.t.ha_nam manastva_si_tparirathyam sarasvati_ (MBh. Karn.a 5.75).**
>
> **tato mayah stavatapasa_ cakre dhi_ma_npura_n.i ha**
> **Tri_n.i ka_n~canamekam tu raupyam ka_rs.n.a_yasam tatha_ (MBh. 5.14).**

The reference to Sarasvati_ river providing the track for S'iva's chariot is a remarkable reference to the impact of tectonics on the Sarasvati_ river and also to the fact that urban civilization (with metallic cities) flourished on the banks of this mighty river as evidenced in the R.gveda and later texts.

Hariyu_piya_ and the Vedic House



Hariyu_piya_ lit. means, 'golden (metallic?) sacrificial posts'. The purs referred to in R.gveda also included caris.n.u or mobile pur. A term, s'a_radi_ pur is used. This is a reference to winter settlements such as Hariyu_piya_.

An alternative view on the nature of the pur in Vedic literature, is presented by Rau: "The evidence to be gleaned from the foregoing Vedic passages...does not fit the cities of the Indus civilization. It rather suggests the existence of numerous, frequently concentric, mud or stone ramparts of round or oval ground plan,-- many times hastily erected—and reinforced by wooden defences, enclosing thatched timber sheds to serve at best as temporary homes but more often to shelter men and their cattle, in times of war, water supply and provisions being therefore of vital importance." (Rau, Wilhelm, 1976, *The meaning* pur *in Vedic literature*, Munich, Abhandlungen der Marburger Gelehrten Gesellschaft, 1973: p.25).

The finds of circular 'pit-dwellings' at Kunal and perhaps also at Banawali, in the Indus civilization belies Rau's observations.



Kunal. Period Ia (Pit dwellings) and Period Ib (Brick-built dwellings). (Plate IIa, S.P. Gupta, 1996, *The Indus-Sarasvati Civilization*, Delhi, Pratibha Prakashan).

On the banks of River Sarasvati. A round 'pit dwelling' 2m dia and 1.1m deep with rammed floor and deepened walls. Pit is cut through the artificially raised red clay platform of .7m thickness and natural soil below the platform. A few post-hboles were found around the pit dwelling were found on the ground level. It is surmised

that a 2m high wattle-and-daub structure of a hut was raised above the ground. (JS Khatri and M. Acharya, 1995, Haryana Dept. of Archaeology).

Banawali. Pits similar to those found at Kunal. Perhaps pit-dwellings. Pits dug into or near the top of the eastern arm of the town wall of the Indus period. (R.S. Bisht, 1982, Excavations at Banawali, in: *Harappan Civilization*, ed. G.L. Possehl, Delhi, Oxford and IBH Publishing Co., Pl. 10.27).

Figure 1. Reed hut from a relief carving from Mathurâ, U.P., ca. second century A.D. (after Percy Brown).

Figure 2. Leaf-thatched dome-and-cornice hut from a relief carving from Gandhâra, Pakistan (after Percy Brown).

Figure 3. Three "scented" huts in the Jetavana garden occupied by Siddhartha from a relief carving on the Buddhist stûpa at Sanchi, ca. early first century A.D. (Photograph courtesy American Institute of Indian Studies, Varanasi.)



Praying to Sarasvati_, paying homage to ancestors

Praying to Sarasvati_ is a recollection in tranquility the comprehensive, all-encompassing memories of the past, which is history. Praying to Sarasvati_ is a prayer to the goddess of knowledge, arts and crafts, patroness of cultural and historical traditions of Bha_rat handed down by hundreds of r.s.is and munis and benevolent pitr.s (departed souls). Praying to Sarasvati_ is a recollection of the bronze-age civilization which dawned on the banks of the River Sarasvati over 5000 years Before Present. Praying to Sarasvati_ is a celebration of her source in Plaks.a Pras’ravan.a, the Himalayan glaciers which are the very fountain of life-giving waters of the nation.

[No wonder, the national poet, Ka_lida_sa calls the Himalayas the devata_tma, the divine-souled: **astyuttarasya_m dis'i devata_tma_ hima_layo na_ma naga_dhira_jah.**]

Sarasvati_ is Mother Goddess in the tradition of Bha_rat. She is the very personification of the country's ancient heritage and civilization. She was a goddess even in the R.gvedic times, devitame Sarasvati_.

When Vya_sa starts his Great Epic, the Maha_bha_rata, he invokes two divinities: one is Na_ra_yan.a, the other is Sarasvati_:

> **Na_ra_yan.am namaskr.tya naram caiva narottamam**
> **Devi_m Sarasvati_m caiva tato jayam udi_rayet**
>
> Salutations to Na_ra_yan.a, the pre-eminent among men; salutations to Devi Sarasvati_, may they endow me with success (in my endeavours).

Banawali, on the banks of River Sarasvati. Mother goddess. Terracotta figurine. (After R.S. Bisht, 1982, Excavations at Banawali, 1974-77, in: Gregory L. Possehl, Harappan Civilization, Delhi, Oxford and IBH, p. 119, Pl. 10.20). The serpentine form depicted through her face and chest are reminiscent of the icon for 'water goddess', Haurvatat, of the Avestan, Zoroastrian tradition. It may also denote an artist's depiction of a necklace adorning the neck and chest of the goddess.

Sarasvati in the R.gveda

All the r.cas of the R.gveda which refer to Sarasvati_ are reproduced below with translation in English (based on Sa_yan.a's commentary and Wilson's initial rendering):

पा॒व॒का नः॒ सर॑स्वती॒ वाजे॑भिर् वा॒जिनी॑वती ।

य॒ज्ञं व॑ष्टु धि॒याव॑सुः ॥

1.003.10 May Sarasvati_, the purifier, the bestower of food, the recompenser of worship with wealth, be attracted by our offered viands to our rite. [Sarasvati_ = va_g-devata_, divinity of speech. The hymn is repeated in Sa_maveda,

Soma Pavama_na hymn: 1.2.2.5 and also in Yajus. Sa_maveda continues the reference to the river Sarasvati_ as deity: pa_vama_ni_ryo adhyertr.s.ibhih sambhr.tarasam tasmai sarasvati_ duhe ks.i_rasarpirmadhu_dakam: whoever reads the essence stored by saints, the Pavama_na hymns, for him Sarasvati_ pours forth water and butter, milk and meath].

चोदयित्री सूनृतानां चेतन्ती सुमतीनाम् ।
यज्ञं दधे सरस्वती ॥

1.003.11 Sarasvati_, the inspirer of those who delight in truth, the instructress of the right-minded, has accepted our sacrifice.

महो अर्णः सरस्वती प्र चेतयति केतुना ।
धियो विश्वा वि राजति ॥

1.003.12 Sarasvati_, makes manifest by her acts a mighty river, and (in her own form) enlightens all understandings. [sarasvati_ is the river in this hymn: dvividha_ hi sarasvati_ vigrahavaddevata_ nadi_ru_pa_ ca, tatra sarasvati_tyetasya nadi_vaddevata_vacca nigama_ bhavanti (Nirukta 2.23)].

इळा सरस्वती मही तिस्रो देवीर् मयोभुवः ।
बर्हिः सीदन्त्व् अस्रिधः ॥

1.013.09 May the three undecaying goddesses, givers of delight, Il.a_, Sarasvati_, and Mahi_ (= Bha_rati_), sit down upon the sacred grass. [Mahi = Bha_rati; Il.a_,Sarasvati_, Bha_rati_ are personifications of agni: agnimu_rtayah; they are also three personified flames of fire. As goddesses, Il.a_ = earth (bride of Vis.n.u); Sarasvati_ = goddess of eloquence (wife of Brahma_); Bha_rati_ = speech (wife of Bharata, an A_ditya)].

अश्व्यो वारो अभवस् तद् इन्द्र सृके यत् त्वा प्रत्यहन् देव एकः ।
अजयो गा अजयः शूर सोमम् अवासृजः सर्तवे सप्त सिन्धून् ॥

1.032.12 When the single resplendent Vr.tra returned the blow (which had been inflicted), Indra, by your thunderbolt, you became (furious), like a horse's tail. You have rescued the kine; you have won, Hero, the Soma juice; you have let loose the seven rivers to flow. [Like a horse's tail, as a horse lashes his tail to get rid of the flies; seven rivers: gan:ga_, yamuna_, sarasvati_, s'atudri_, parus.n.i_ (ira_vati_), asikni, marudvr.dha_, vitasta_, a_rji_ki_ya (vipa_sa_) and sus.oma_ (sindhu)].

प्रैतु ब्रह्मणस् पतिः प्र देव्य् एतु सूनृता ।

अच्छा वीरं नर्यम् पङ्क्तिराधसं देवा यज्ञं नयन्तु नः ॥

1.040.03 May Brahman.aspati approach us; may the goddess, speaker of truth, approach us; may the gods (drive away) every adversary, and present, conduct us to the sacrifice which is beneficial to man, and (abounds) with respectably-presented offerings. [devi sunr.ta_ = goddess of speech or va_k devata_; she is priyasatyaru_pa, lover of truth, a form of Sarasvati_].

तान् पूर्वया निविदा हूमहे वयम् भगम् मित्रम् अदितिं दक्षम् अस्रिधम् ।

अर्यमणं वरुणं सोमम् अश्विना सरस्वती नः सुभगा मयस् करत् ॥

1.089.03 We invoke them with an ancient text, Bhaga, Mitra, Aditi, Daks.a, Asridh, Aryaman, Varun.a, Soma, the As'vins; and may the gracious Sarasvati_ grant us happiness. [pu_rvoya_ nivida_: nivid = va_k, speech, or a text. Bhaga and Mitra are A_dityas (Mitra is the lord of the day: maitram va_ ahar (Taittiri_ya Bra_hman.a); Daks.a is a Praja_pati, able to make the world (he is also the creator, Hiran.yagarbha, diffused among breathing or living creatures as breath or life; pra_n.o vai daks.ah, daks.a is verily breath (Taittiri_ya Sam.hita_: 2.5.2.4); Asrid = fr. sridh, to dry up; hence, undrying, unchanging (i.e. the class of Maruts); Aryaman = the sun (asau va_ a_ditya aryama, he, the sun, is Aryaman (Taittiri_ya Sam.hita_ 2.3.4.1); Varun.a = fr. vr., to surround, encompassing the wicked with his bond; he is also the lord of the night: va_run.i ra_tri_ (Taittiri_ya Bra_hman.a 1.7.10.1); Soma is two-fold, the product of the earth and the moon, as a divinity in heaven. The As'vins are so termed either from having horses (as'vavantau), or from pervading all things, the one with moisture, the other with light; they are heaven and earth,

they are day and night, the sun and the moon; aitiha_sika, traditionists; they were two virtuous princes (Nirukta, 12,1)].
1.089.04 May the wind waft to us the grateful medicament; may mother earth, may father heaven, (convey) it (to us); may the stones that express Soma, and are productive of pleasure (bring) it (to us); As'vins, who are to be meditated upon, hear (our submission). [bhes.ajam: as'vins, the physicians of the gods bestow the medicament].

शुचिर् देवेष्व् अर्पिता होत्रा मरुत्सु भारती ।

इळा सरस्वती मही बर्हिः सीदन्तु यज्ञियाः ॥

1.142.09 May the pure hota_, placed among the gods, and Bha_rati_, among the Maruts, and may the adorable Il.a_, Sarasvati_, Mahi_, sit down upon the sacred grass. [hota_ = homa-nis.pa_dika_, the presenter of the oblation; deves.u arpita_ = delivered amongst the gods, the praisers of priests (Marutsu); or, marutsu-bha_rati_ = va_c, situated in heaven, dyustha_na_ and connected with bharata, an A_ditya, or name of the sun; il.a_, sarasvati_, mahi_ = sound (va_c); or the goddesses presiding over sound in the three regions, severally of earth, firmament, and heaven].

यस् ते स्तनः शशयो यो मयोभूर् येन विश्वा पुष्यसि वार्याणि ।

यो रत्नधा वसुविद् यः सुदत्रः सरस्वति तम् इह धातवे कः ॥

1.164.49 Sarasvati_, that retiring breast, which is the source of delight, with which you bestow all good things, which is the container of wealth, the distributor of riches, the giver of good (fortune); that (bodom) do you lay open at this season for our nourishment.

भारतीळे सरस्वति या वः सर्वा उपब्रुवे ।

ता नश् चोदयत श्रिये ॥

1.188.08 Bha_rati_, Il.a_, Sarasvati_, I invoke you all, that you may direct us to prosperity. [Bha_rati_, the goddess presiding over the heaven; Il.a_, the goddess presiding over the earth; Sarasvati_, the goddess presiding over the firmament; they are all three considered to be special manifestations of the majesty of the sun: etis tisra a_dityaprabha_va vis'es.aru_pa itya_huh].

त्वम् अ॑ग्ने॒ अदि॑तिर् देव दा॒शुषे॒ त्वं होत्रा॒ भार॑ती वर्ध॑से गि॒रा ।

त्वम् इळा॑ श॒तहि॑मासि॒ दक्ष॑से॒ त्वं वृ॑त्र॒हा व॑सुपते॒ सर॑स्वती ॥

2.001.11 You, divine Agni, are Aditi to the donor of the oblation; you are Hota_ and Bha_rati_, and thive by praise; you are Il.a_ of a hundred winters to him who makes you gifts; you, lord of wealth, are the destroyer of Vr.tra, Sarasvati_. [Il.a_ of a hundred winters: tvam il.a_; s'atahima_si = the earth of unlimited duration, aparimitaka_la bhu_mih; destroyer of Vr.tra: vr.traha_ = destroyer of sin].

सर॑स्वती सा॒धय॑न्ती॒ धियं॑ न॒ इळा॑ दे॒वी भार॑ती वि॒श्वतू॑र्तिः ।

ति॒स्रो दे॒वीः स्व॒धया॑ ब॒र्हिर् एदम् अच्छि॑द्रम् पान्तु शर॒णं नि॒षद्य॑ ॥

2.003.08 May the three goddesses, Sarasvati_, perfecting our understanding, the divine il.a_, and all-impressive Bha_rati_, having come to our dwelling, protect this faultless rite, (offered) for our welfare.

सर॑स्वति॒ त्वम् अ॒स्माअ॑विड्ढि म॒रुत्व॑ती धृष॒ती जे॑षि॒ शत्रू॑न् ।

त्यं चि॒च् छर्ध॑न्तं तविषी॒यमा॑ण॒म् इन्द्रो॑ हन्ति वृष॒भं शण्डि॑कानाम् ॥

2.030.08 Sarasvati_, do you protect us; associated with the Maruts and firm (of purpose), overcome our foes, whiilst Indra slays the chief of the S'an.d.ikas, defying him and confiding in his strength. [S'an.d.ikas : vr.s.abham s'an.d.ika_na_m, descendants of s'an.d.a, who, with Amarka, is the purohita, or priest of the asuras [s'an.d.a_marka_vasurapurohitau (Taittiri_ya Sam.hita_: 6.4.10.1)].

या गु॒ङ्गूर् या सि॑नीवा॒ली या रा॒का या सर॑स्वती ।

इ॒न्द्रा॒णीम् अ॑ह्व ऊ॒तये॑ वरुणा॒नी स्व॒स्तये॑ ॥

2.032.08 I invoke her who is Gun:gu_, who is Sini_va_li_, who is Ra_ka_, who is Sarasvati_; (I invoke) Indra_n.i_ for protection, Varun.a_ni_ for welfare. [Gan:gu_ = kuhu, the day of conjunction, when the moon rises invisible; these

phases of moon were perhaps, identifiable with Indra_n.i_ or Varun.a_ni_, or with both].

सम् अ॒न्या यन्त्य् उप॑ यन्त्य् अ॒न्याः स॑मा॒नम् ऊ॒र्वं न॒द्यः पृणन्ति ।

तम् ऊ॒ शुचिं॒ शुच॑यो दीदि॒वांस॑म् अ॒पां नपा॑त॒म् परि॑ तस्थु॒र् आपः॑ ॥

तम् अस्मे॑रा युव॒तयो॒ युवा॑नम् मर्मृ॒ज्यमा॑नाः॒ परि॑ य॒न्त्य् आपः॑ ।

स शु॒क्रेभिः॒ शिक्व॑भी रे॒वद् अ॒स्मे दी॒दाया॑नि॒ध्मो घृ॒तनि॑र्णि॒ग् अ॒प्सु ॥

अ॒स्मै ति॒स्रो अ॑व्य॒थ्याय॒ नारी॑र् दे॒वाय॑ दे॒वीर् दि॑धिष॒न्त्य् अन्न॑म् ।

कृता॑ इ॒वोप॒ हि प्र॑स॒र्स्रे अ॒प्सु स पी॒यूषं॑ धयति पूर्व॒सूना॑म् ॥

2.035.03 Some waters collect together (from the rain); others, (already collected on earth), unite with them; as rivers, they flow together to propitiate the ocean-fire; the pure waters are gathered round the pure and brilliant grandsons of the waters. [The ocean-fire: u_rvam nadyah pr.n.anti: u_rva = submarine fire, samudramadhye vartama_nam vad.ava_nalam; another explanation for the hymn: the reference is to two sorts of water:one termed ekadhana_h, the other vasati_varya_h, apparently the juice of the Soma, as distinguished by their employment in the Agni-s.omi_ya sacrifice, after collecting the fat of the victim, and which are to be mixed for the completion of the ceremony; the mantra used on the occasion is yajus. 6.23; in this yajus., vasati_vari_ = vasati_vari_ sam.jn~a_m soma_rtha_na_m apa_m grahan.am ka_ryam, the taking of the waters named vasati_vari_, which mean, the Soma is observed; cf. Ka_tya_yana su_tras 8.9, 7.10].

2.035.04 The young and modest (waters) wait upon the youth, assiduous in bathing him, and he, although unfed with fuel, yet cleansed with clarified butter, shines with bright rays amidst the waters, the abundance (may be) to us. [Bright rays amidst the waters: allusion either to the submarine fire or to the lightning amidst the rain-clouds].

2.035.05 Three divine females present food to that uninjurable divinity; as if formed in the waters they spread abroad, and he drinks the ambrosia of the first-created (elements). [The three divine females: il.a_, sarasvati_ and bha_rati_,personifications of sacred prayer or praise; as if formed in the waters:

kr.ta_ iva upa hi prasarsre apsu, they have proceeded or issued, as if made, in the waters; sa pi_yus.am dhayati pu_r vasu_na_m, he drinks the nectar, that is, the Soma, of those first born; the essence of the waters which were the first created things by Brahma_; pu_rvam bra_hman.ah saka_s'a_d utpanna_na_m apa_m sa_rabhu_tam].

अम्बितमे नदीतमे देवितमे सरस्वति ।

अप्रशस्ता इव स्मसि प्रशस्तिम् अम्ब नस् कृधि ॥

त्वे विश्वा सरस्वति श्रितायूंषि देव्याम् ।

शुनहोत्रेषु मत्स्व प्रजां देवि दिदिड्ढि नः ॥

इमा ब्रह्म सरस्वति जुषस्व वाजिनीवति ।

या ते मन्म गृत्समदा ऋतावरि प्रिया देवेषु जुह्वति ॥

2.041.16 Sarasvati_, best of mothers, best of rivers, best of goddesses, we are, as it were, of no repute; grant us, mother, distinction. [ambitame, nadi_tame, devitame: the superlatives of ambika_, a mother, nadi_ , a river and devi_, a goddess].
2.041.17 In you, Sarasvati_, who are divine, all existences are collected; rejoice, goddess, among the S'unahotras, grant us, goddess, progeny.
2.041.18 Sarasvati_, abounding in food, abounding in water, be propitiated by these oblations, which the Gr.tsamadas offer as acceptable to you, and precious of the gods.

आ भारती भारतीभिः सजोषा इळा देवैर् मनुष्येभिर् अग्निः ।

सरस्वती सारस्वतेभिर् अर्वाक् तिस्रो देवीर् बर्हिर् एदं सदन्तु ॥

3.004.08 May Bha_rati_, associated with the Bha_rati_s; Il.a_ with the gods and men; and Agni, and Sarasvati_ with the Sa_rasvatas; may the three goddesses sit down upon the sacred grass (strewn) before them. [bha_rati_bhih, with the connections of Bharata, or the Sun: bharatasya su_ryasya sambandhini_bhih, perhaps intending the solar rays; Bha_rati_ = va_k, speech; Il.a_ = bhu_mi, the earth; sarasvati_ = ma_dhyamika_ va_k; the sa_rasvatas are

the madhyamastha_nas, the middle regions, or the firmament; Agni whose name is rather unconnectedly inserted, is thus identified through their several personifications as goddesses, with heaven, mid-heaven, and earth, or with speech or sound in the three regions].

नि त्वा दधे वर आ पृथिव्या इळायास् पदे सुदिनत्वे अह्नाम् ।

दृषद्वत्याम् मानुष आपयायां सरस्वत्यां रेवद् अग्ने दिदीहि ॥

3.023.04 I place you in an excellent spot of earth on an auspicious day of days; do you, Agni, shine on the frequent (banks) of the Dr.s.advati, A_paya_ and Sarasvati_ rivers. [In an excellent spot of earth: pr.thivya_ il.a_yaspade, in the footmark of the earth in the form of a cow; i.e. on the northern altar; frequented banks: ma_nus.e, relating to man or to Manu; implies, manus.ya sam.caran.avis.aye ti_re, on a bank, a place frequented by men; the Dr.s.advati_ and Sarasvati_ rivers are well known (r.s.ayo vai sarasvatya_m satrama_sata : Aitareya Bra_hman.a 2.19)].

विद्युद्रथा मरुत ऋष्टिमन्तो दिवो मर्या ऋतजाता अयासः ।

सरस्वती शृणवन् यज्ञियासो धाता रयिं सहवीरं तुरासः ॥

3.054.13 May the Maruts, whose cars are the lightning, who are armed with spears, resplendent, destroyers of foes, from whom the waters proceed, (who are) unresting and adorable, and may Sarasvati_ hear (my prayer); and may you (maruts), speedy in your liberality, bestow (upon us) riches and good offspring.

त्री षधस्था सिन्धवस् त्रिः कवीनाम् उत त्रिमाता विदथेषु सम्राट् ।

ऋतावरीर् योषणास् तिस्रो अप्यास् त्रिर् आ दिवो विदथे पत्यमानाः ॥

3.056.05 Rivers, the dwelling-places of the intelligent gods are thrice three; the measurer of the three (worlds) is the sovereign at sacrifices; three female (divinities) of the waters charged with the rains descend from heaven at the thrice (repeated) solemnity. [Each of the three lokas has three divisions; this information is addressed to the river, Sindhavah being in the vocative case; the measurer of the three worlds: the sun or the year; three female divinities: il.a_, sarasvati_ and bha_rati_].

इळा॒सर॑स्वती म॒ही ति॒स्रो दे॒वीर् म॑यो॒भुव॑ः ।
ब॒र्हिः सी॑दन्त्व् अ॒स्रिध॑ः ॥

5.005.08 May Il.a_, Sarasvati_, Mahi_, the three goddesses who are the sources of happiness, sit down, benevolent, upon the sacred grass.

दमू॑नसो अ॒पसो॒ ये सु॒हस्ता॒ वृष्ण॒ः पत्नी॑र् न॒द्यो विभ्वत॒ष्टाः ।
सर॑स्वती बृहद्दि॒वोत रा॒का द॑श॒स्यन्ती॑र् वरिवस्यन्तु शु॒भ्राः ॥

5.042.12 May the dexterous-handed, humble-minded artist (of the gods, the R.bhus); may the wives of the showerer (Indra); may the rivers carved out by Vibhu; may Sarasvati_ and the brilliant Ra_ka_, the illustrious granters of desires, be willing to grant us riches.

आ नो॑ दि॒वो बृ॑ह॒तः पर्व॑ता॒द् आ सर॑स्वती यज॒ता ग॑न्तु य॒ज्ञम् ।
हवं॑ दे॒वी जु॑जुषा॒णा घृ॒ताची॑ श॒ग्मां नो॒ वाच॑म् उश॒ती शृ॑णोतु ॥

5.043.11 May the radiant Sarasvati_ come to the sacrifice from the heavens or the spacious firmament; may the goddess, the showerer of water, propitiated by our invocation, and desirous of our gratifying praises hear.

अग्न॒ इन्द्र॒ वरु॑ण॒ मित्र॒ देवा॒ः शर्ध॒ः प्र य॑न्त॒ मारु॑तो॒त वि॑ष्णो ।
उ॒भा नास॑त्या रु॒द्रो अध॒ ग्नाः पूषा भग॒ः सर॑स्वती जुषन्त ॥

5.046.02 Agni, Indra, Varun.a, Mitra, gods, confer (upon us) strength; or, company of the Maruts, or Vis.n.u, (bestow it); and may both the Na_satyas, Rudra, the wives of the gods, Pu_s.an, Bhaga, Sarasvati_, be pleased (by our adoration).

पावी॑रवी क॒न्या चि॒त्रायु॒ः सर॑स्वती वी॒रप॑त्नी॒ धियं॑ धात् ।
ग्नाभि॒र् अच्छि॑द्रं शर॒णं स॒जोषा॑ दुरा॒धर्षं॑ गृण॒ते शर्म॑ यंसत् ॥

6.049.07 May the purifying, amiable, graceful Sarasvati_, the bride of the hero,

favour our pious rite; may she, together with the wives of the gods, well pleased, bestow upon him who praises her a habitation free from defects and impenetrable (to wind and rain), and (grant him) felicity. [Amiable: kanya_ = a maiden (gna_h ga_yajya_di_ni chanda_m.si, chanda_m.si vai gna_h: *Taitiri_ya Sam.hita_* 5.1.7.2); kamani_ya_, to be desired or loved; vi_rapatni_ = the wife of the hero (Praja_pati or Brahma_); or, simply, the protectress of heroes or of men].

ते नो॑ रु॒द्रः सर॑स्वती स॒जोषा॑ मी॒ळ्हुष्म॑न्तो॒ विष्णु॒र् मृळन्तु वा॒युः ।

ऋ॒भु॒क्षा वाजो॒ दैव्यो॑ विधा॒ता प॒र्जन्या॒वाता॑ पिप्यता॒म् इषं॑ नः ॥

6.050.12 May Rudra and Sarasvati_, alike well pleased and Vis.n.u and Va_yu, make us happy, sending rain; and Ribhuks.in, and Va_ja, and the divine Vidha_ta_; and may Parjanya and Va_ta grant us abundant food.

इन्द्रो॒ नेदि॑ष्ठ॒म् अव॒सागमि॑ष्ठः सर॑स्वती॒ सिन्धु॑भिः॒ पिन्व॑माना ।

प॒र्जन्यो॑ न॒ ओष॑धीभिर् मयो॒भुर् अ॒ग्निः सु॒शृलतसः॑ सु॒हवः॑ पि॒तेव॑ ॥

6.052.06 May Indra be most prompt to come nigh for our protection, and Sarasvati_ dwelling with (tributary) rivers; may Parjanya, with the plants, be a giver of happiness; and may Agni, worthily praised and earnestly invoked, (be to us) like a father.r.s.i: bharadva_ja ba_rhaspatya; devata_: sarasvati_; chanda: ga_yatri_, 1-3, 13 jagati_, 14 tris.t.up

इ॒यम् अ॑ददाद् र॒भ॒सम् ऋ॑ण॒च्युतं॒ दिवो॑दासं वध्र्य॒श्वाय॑ दा॒शुषे॑ ।

या शश्व॑न्तम् आच॒खादा॑व॒सम् प॒णिं ता ते॑ दा॒त्राणि॑ तवि॒षा स॑रस्वति ॥

इ॒यं शुष्मे॑भिर् बिस॒खा इ॑वारुज॒त् सानु॑ गिरी॒णां त॑वि॒षेभि॑र् ऊ॒र्मिभिः॑ ।

पा॒रा॒व॒त॒घ्नीम् अव॑से सुवृ॒क्तिभिः॒ सर॑स्वती॒म् आ वि॑वासेम धी॒तिभिः॑ ॥

सर॑स्वति देव॒निदो॒ नि ब॑र्हय प्र॒जां विश्व॑स्य॒ बृस॑यस्य मा॒यिनः॑ ।

उ॒त क्षि॒तिभ्यो॑ ऽव॒नीर् अ॑विन्दो वि॒षम् ए॑भ्यो अस्रवो वाजिनीवति ॥

प्र णो॑ दे॒वी सर॑स्वती॒ वाजे॑भिर् वा॒जिनी॑वती ।
धी॒नाम् अ॑वि॒त्र्य् अवतु ॥ यस् त्वा॑ देवि सरस्वत्य् उपब्रू॒ते धने॑ हि॒ते ।
इन्द्रं॒ न वृ॑त्र॒तूर्ये॑ ॥
त्वं दे॑वि सरस्व॒त्य् अवा॒ वाजे॑षु वाजिनि ।
रदा॑ पू॒षेव॑ नः स॒निम् ॥
उ॒त स्या न॒ः सर॑स्वती घो॒रा हिर॑ण्यवर्तनिः ।
वृ॒त्र॒घ्नी व॑ष्टि सुष्टु॒तिम् ॥
यस्या॑ अन॒न्तो अ॑तस् त्वे॒षश् च॑रि॒ष्णुर् अ॑र्ण॒वः ।
अम॒श् चर॑ति॒ रोरु॑वत् ॥
सा नो॒ विश्वा॒ अति॒ द्विष॒ः स्वसॄ॑र् अ॒न्या ऋ॒ताव॑री ।
अत॒न्न् अहे॑व॒ सूर्य॑ः ॥
उ॒त न॑ः प्रि॒या प्रि॒यासु॑ स॒प्तस्व॑सा॒ सुजु॑ष्टा ।
सर॑स्वती॒ स्तोम्या॑ भूत् ॥
आ॒प॒प्रुषी॒ पार्थि॑वान्य् उ॒रु रजो॑ अ॒न्तरि॑क्षम् ।
सर॑स्वती नि॒दस् पा॑तु ॥
त्रि॒ष॒धस्था॑ स॒प्तधा॑तु॒ः पञ्च॑ जा॒ता व॒र्धय॑न्ती ।
वाजे॑-वाजे॒ हव्या॑ भूत् ॥
प्र या म॑हि॒म्ना म॒हिना॑सु॒ चेकि॑ते द्यु॒म्नेभि॑र् अ॒न्या अ॒पसा॑म् अ॒पस्त॑मा ।

रथ इव बृहती विभ्वने कृतोपस्तुत्या चिकितुषा सरस्वती ॥
सरस्वत्य् अभि नो नेषि वस्यो माप स्फरीः पयसा मा न आ धक् ।
जुषस्व नः सख्या वेश्या च मा त्वत् क्षेत्राण्य् अरणानि गन्म ॥

6.061.01 She gave to the donor of the oblations, Vadhryas'va, a son Divoda_sa endowed with speed, and acquitting the debt (due to gods and progenitors), she who destroyed the churlis niggard, (thinking) only of himself, such are your bounties, Sarasvati_. (Divoda_sa: *Vis.n.u Pura_n.a* makes the father of Divoda_sa, Bahvas'va but this is a representation of the nameBandhyas'va; the churlish niggard: Pan.i is the obvious reference].

6.061.02 With impetuous and mighty waves she breaks down the precipices of the mountains, like a digger for the lotus fibres; we adore for our protection, the praises and with sacred rites, Sarasvati_ the underminer of both her banks. [With impetuous and mighty waters: the firs r.ca addresses Sarasvati_ as a goddess; in this r.ca, she is praised as a river; in this entire su_kta, this alternative attribution is apparent; like a digger for the lotus-fibres: bisa-kha_ iva bisam khanati, who digs the bisa, the long fibres of the stem of the lotus, in delving for which he breaks down the banks of the pond].

6.061.03 Destroy, Sarasvati_, the revilers of the gods, the offspring of the universal deluder, Br.saya; giver of sustenance, you have acquired for men the lands (seized by the asuras), and have showered water upon them. [Br.saya: Br.saya is a name of Tvas.t.a_, whose son was Vr.tra; Sa_yan.a, provides a legend in his introduction to the *Black Taittiri_a Yajus.*, to illustrate te importance of correctly accentuating the words of the Veda: Indra, had killed a son of Tvas.t.a_, named Vis'varu_pa, in conseqence of which there was enmity between them. Upon the occasion of a Soma sacrifice celebrated by Tvas.t.a_, he omitted to include Indra in his invitation to the gods. Indra, however, came an uninvited guest, and by force took a part of the Soma libation. With the remainder Tvas.t.a_ performed a sacrifice for the birth of an individual who should avenge his quarrel and destroy his adversary, directing the priest to pray, now let a man be born and prosper, the killer of Indra. In uttering the mantra, however, the officiating priest made a mistake in the accentuation of the term indragha_taka, slayer of Indra, in which sense as a tatpurus.a compound, the acute accent should have been placed upon the last syllable. Instead of this, the reciter of the mantra placed the acent upon the first syllable, whereby the compound became a bahuvri_hi epithet, signifying one of whom

Indra is the slayer. Consequently, wen by virtue of the rite, Vr.tra was produced, he was fore-doomed by the wrong accentuation to be put to death by Indra instead of becoming the destroyer. You have acquired for men: ks.itibhyo avani_ravindo vis.am abhyo asravah = you have shed poison upon them, or destroyed them].
6.061.04 May the divine Sarasvati_, the acceptress of (sacrificial) food, the protectress of her worshippers, sustain us with (abundant) viands.
6.061.05 Divine Sarasvati_, protect him engaged in conflict for the sake of wealth, who glorifies you like Indra.
6.061.06 Divine Sarasvati_, abounding in food, protect us in combat, and, like Pu_s.an, give us gifts.
6.061.07 May the fierce Sarasvati_, riding in a golden chariot, the destructress of enemies, be pleased by our earnest laudation.
6.061.08 May she whose might, infinite, undeviating, splendid, progressive, water-shedding, proceeds loud-sounding.
6.061.09 Overcome all our adversaries, and bring to us her other water-laden sisters, as the ever-rolling sun (leads on) the days. [Bring to us: ati svasr.ranya_ r.ta_vari_: ati = atini, to lead over or beyond, or ati dvis.ah, may the other sisters overcome those who hate us].
6.061.10 May Sarasvati_, who has seven sisters, who is dearest among those dear to us, and is fully propitiated, be ever adorable. [Seven sisters: saptasvasa_: either the seven metres of the vedas, or the seven rivers].
6.061.11 May Sarasvati_, filing (with radiance) the expanse of earth and heaven, defend us from the reviled.
6.061.12 Abiding in the three worlds, comprising seven elements, cherishing the five races (of beings), she is ever to be invoked in battle. [Seven elements: saptadha_tu: either the metres or the river]. [Ra_hula Sa_n:kr.ta_yana, *Rigvedic A_rya*, Allahabad, 1957, pp. 18-22; cf. yad indra_gni yadus.u turvas'es.u yad druhyus.unus.u pu_rus.u sthah (RV 1.108.8). The five peoples are: Pu_ru, Turvas'a, Yadu, Anu and Druhyu; all five were sons of Yaya_ti. Pu_rus lived by the banks of the Sarasvati_ river: ubhe yat te mahina_ s'ubhre andhasi_ adhiks.iyanti pu_ravah sa_ no bodhyavitri_ marutsakha_ coda ra_dho maghona_m (RV. 7.96.2). The king of Pu_ru was Trasadasyu. Turvas'a and Yadu are frequently mentioned together. Anu seem to have settled on the banks of Parus.n.i. The Pu_ru, Turvas'a, Yadu and Anu formed a coalition and suffered heavy losses in the battle against Suda_s, the chief of Tr.tsu. The Matsya (mentioned once in RV) and Bharatas, too, were in conflict with Tr.tsu. "Nahus.a was the son of A_yu, the grandson of Puru_ravas and the great grandson of

Ila_. Yaya_ti had five sons, viz., Yadu, Turvas'a, Anu, Druhyu and Pu_ru, of whom the first four migrated to other areas while Pu_ru and his descendants ruled over the ancestral domain." (M.L.Bhargava, *The Geography of Rigvedic India*, Lucknow, 1964, p. 93). Alternative interpretation: the five races may refer to Bharatas, the Kurus, the Pusamas, the Matsyas and the Videgha (Videha). (H.C. Raychaudhuri, The Sarasvati_, *Science and Culture* 8(12), July 1942-June 1943, Nos. 1-2, p. 470)].

6.061.13 She who is disinguished among them as eminent in greatness and in her glories; she who is the most impetuous of all other streams; she who as been created vast in capacity as a chariot, she, Sarasvati_, is to be glorified by the discree (worshippers). [Among them: A_su, among them, divinities, or rivers, devata_na_m nadi_na_m madhye; vast in capacity as a chariot: ratha iva br.hati_ vibhvane kr.ta, made great in vasness, like a chariot created by Praja_pati, so created, vibhvane, vibhutva_ya, for greatness or vastness]. 6.061.14 Guide us, Sarasvati_, to precious wealth; reduce us no to insignificance; overwhelm us not with (excess of) water; be pleased by our friendly (services) and access to our habitations, and let us not repair to places unacceptable to you. [Reduce us not: ma_ apa sphari_h: sphara = increase, greatness, prosperity; with the prefix, it implies the reverse, apravr.ddha_n ma_ ka_rs.i_h, do not make us unimportant or abject].

आ भार॑ती॒ भार॑तीभिः स॒जोषा॒ इळा॑ दे॒वैर् म॑नु॒ष्ये॑भिर् अ॒ग्निः ।

सर॑स्वती सारस्व॒तेभि॑र् अ॒र्वाक् ति॒स्रो दे॒वीर् ब॒र्हिर् एदं स॑दन्तु ॥

7.002.08 May Bharati, associated with the Bharatis; Il.a_ with gods and men; and Agni and Sarasvati_ with the Sa_rasvatas; may the three goddesses sit down before us upon this sacred grass. [Il.a_ with gods and man: il.a_ devabhir manus.yebhir agnih; Il.a_ is associated with men; Agni is associated with the goddesses. This and the three following verses are repeated from the second as.t.aka].

अग्ने॑ या॒हि दू॒त्यम् मा रि॑षण्यो दे॒वाअच्छा॑ ब्रह्म॒कृता॑ ग॒णेन॑ ।

सर॑स्वतीम् म॒रुतो॑ अ॒श्विना॒पो यक्षि॑ दे॒वान् र॑त्न॒धेया॑य॒ विश्वा॑न् ॥

7.009.05 Repair, Agni, to the presence of the gods in your office of messenger, (sent) by the assembly engaged in prayer; neglect us not; offer worship to

Sarasvati, the Maruts, the As'vins, the waters, the universal gods, that they may bestow treasures (upon us).

शं नो॑ दे॒वा वि॒श्वदे॑वा भवन्तु॒ शं सर॑स्वती स॒ह धी॒भिर् अ॑स्तु ।

शम् अ॑भि॒षाचः॒ शम् उ॑ राति॒षाचः॒ शं नो॑ दि॒व्याः पार्थि॑वाः॒ शं नो॒

अप्याः॑ ॥

7.035.11 May the divine universal gods be (favourable) to our felicity; may Sarasvati_, with holy rites, be happiness; may those who assist at sacrifices, those who are liberal of gifts. Be (conducive to) our happiness; may celestial, terrestrial and aquatic things be (subservient to) our happiness.

आ यत् सा॒कं य॒शसो॑ वावशा॒नाः सर॑स्वती स॒प्तथी॒ सिन्धु॑माता ।

याः सु॒ष्वय॑न्त सु॒दुघाः॑ सु॒धा॒रा अ॒भि स्वेन॒ पय॑सा॒ पीप्या॑नाः ॥

उ॒त त्ये नो॑ म॒रुतो॑ मन्दसा॒ना धियं॑ तो॒कं च॑ वा॒जिनो॑ ऽवन्तु ।

मा नः॒ परि॑ ख्यद् अक्ष॑रा॒ चर॒न्त्य् अवी॑वृध॒न् युज्यं॒ ते र॒यिं नः॑ ॥

7.036.06 May the seventh (stream), Sarasvati_, the mother of the Sindhu and those rivers that flow copious and fertilizing, bestowing abundance of food, and nourishing (the people) by their waters come at once together. [The mother of the Sindhu: sindhu ma_ta_ = apam ma_tr.bhu_ta_, being the mother of the waters].

7.036.07 May these joyous and swift-going Maruts protect our sacrifice and our offspring; let not the imperishable goddess of speech, deserting us, speak (kindly) to our (adversaries); and may both (she and the Marut) associated augment our riches. [Let not the imperishable goddess of speech: ma_ nah parikhyad aks.ara_ caranti = aks.ara_ vya_pta_ caranti va_gdevata_ asma_n parityaktva_ asma_d vyatirikta_ ma_ dra_ks.i_t, let not the diffusive deity of speech, having abandoned us, look upon our opponents].

आग्ने॒ गिरो॑ दि॒व आ पृ॑थि॒व्या मि॒त्रं व॑ह॒ वरु॑ण॒म् इन्द्र॑म् अ॒ग्निम् ।

आर्य॒मण॒म् अदि॑तिं॒ विष्णु॑म् एषां॒ सर॑स्वती म॒रुतो॑ मादयन्ताम् ॥

7.039.05 Bring Agni, whether from heaven or earth, the adorable deities Mitra, Varun.a, Indra and Agni, A_ryaman, Aditi and Vis.n.u (for the good) of these

(worshippers); and may Sarasvati_ and the Maruts be delighted (by our offerings).

सेद् उग्रो अस्तु मरुतः स शुष्मी यम् मर्त्यम् पृषदश्वा अवाथ ।

उतेम् अग्निः सरस्वती जुनन्ति न तस्य रायः पर्येतास्ति ॥

7.040.03 Maruts, whose steeds are the spotted deer, may the mortal whom you protect the resolute, be strong, for him Agni and Sarasvati_ also defend, and there be no despoiler of his riches.

मात्र पूषन्न् आघृण इरस्यो वरूत्री यद् रातिषाचश् च रासन् ।

मयोभुवो नो अर्वन्तो नि पान्तु वृष्टिम् परिज्मा वातो ददातु ॥

7.040.06 Resplendent Pu_s.an, oppose not (hindrance) on this occasion; may the protectress, (Sarasvati_) and the liberal (wives of the gods), grant us wealth; may the ever-moving deities, the sources of happiness, protect us; may the circumambient Va_ta send us rain. r.s.i: vasis.t.ha maitra_varun.i; devata_: sarasvati_, 3 sarasva_n; chanda: tris.t.up

प्र क्षोदसा धायसा सस्र एषा सरस्वती धरुणम् आयसी पूः ।

प्रबाबधाना रथ्येव याति विश्वा अपो महिना सिन्धुर् अन्याः ॥

एकाचेतत् सरस्वती नदीनां शुचिर् यती गिरिभ्य आ समुद्रात् ।

रायश् चेतन्ती भुवनस्य भूरेर् घृतम् पयो दुदुहे नाहुषाय ॥

स वावृधे नर्यो योषणासु वृषा शिशुर् वृषभो यज्ञियासु ।

स वाजिनम् मघवद्भ्यो दधाति वि सातये तन्वम् मामृजीत ॥

उत स्या नः सरस्वती जुषाणोप श्रवत् सुभगा यज्ञे अस्मिन् ।

मितज्ञुभिर् नमस्यैर् इयाना राया युजा चिद् उत्तरा सखिभ्यः ॥

इमा जुह्वाना युष्मद् आ नमोभिः प्रति स्तोमं सरस्वति जुषस्व ।

तव शर्मन् प्रियतमे दधाना उप स्थेयाम शरणं न वृक्षम् ॥

अयम् उ ते सरस्वति वसिष्ठो द्वारांव् ऋतस्य सुभगे व्यू आवः ।

वर्ध शुभ्रे स्तुवते रासि वाजान् यूयम् पात स्वस्तिभिः सदा नः ॥

7.095.01 This Sarasvati_, firm as a city made of metal, flows rapidly with all sustaining water, sweeping away in its might all other waters, as a charioteer (clears the road). [Firm as a city: dharun.am a_yasi pu_h = ayasa nirmita puri_va; dharun.am = dharun.a, dha_rayitri_, supporter].
7.095.02 Sarasvati_, chief and pure of rivers, flowing from the mountains to the ocean, understood the request of Nahus.a, and distributing riches among the many existing beings, milked for him butter and water. [Milked for him: the legend is that king Nahus.a, before performing a sacrifice for a thousand years, prayed to Sarasvati_, who gave him butter and water, or milk, sufficient for that period].
7.095.03 The showerer Sarasvat, the friend of man, a showerer (of benefits), even while yet a child, continually increases among his adorable wives (the rains); he bestows upon the affluent (worshippers) a vigorous son; he purifies their persons (to fit them) for the reception (of his bounties). [Sarasvat: Sarasvat is the wind Va_yu in the firmament, madhyastha_no va_yuh sarasvat].
7.095.04 May the auspicious and gracious Sarasvati_ hear (our praises) at this sacrifice, approached as she is with reverence and with bended knees, and most liberal to her friends with the riches she possesses.
7.095.05 Presenting to you, Sarasvati_, these oblations with reverence (may we receive from you affluence); be gratified by our praise and may we, being retained in your dearest felicity, ever recline upon you, as on a sheltering tree. [May we receive: yus.mad a: a = also; adadi_mahi, may we receive].
7.095.06 Auspicious Sarasvati_, for you Vasis.t.ha has set open the two doors (the east and west) of sacrifice; white-complexioned (goddess), be magnified; bestow food on him who glorifies you; and do you (gods) ever cherish us with blessings.
r.s.i: vasis.t.ha maitra_varun.i; devata_: sarasvati_, 4-6 sarasva_n; chanda: 1-2 praga_tha (1 vis.ama_ br.hati_, 2 sama_sato br.hati_) 3 prastara pan:kti, 4-6 ga_yatri_

बृहद् उ गायिषे वचो ऽसुर्या नदीनाम् ।
सरस्वतीम् इन् महया सुवृक्तिभि स्तोमैर् वसिष्ठ रोदसी ॥
उभे यत् ते महिना शुभ्रे अन्धसी अधिक्षियन्ति पूरवः ।
सा नो बोध्य् अवित्री मरुत्सखा चोद राधो मघोनाम् ॥
भद्रम् इद् भद्रा कृणवत् सरस्वत्य् अकवारी चेतति वाजिनीवती ।
गृणाना जमदग्निवत् स्तुवाना च वसिष्ठवत् ॥
जनीयन्तो न्व् अग्रवः पुत्रीयन्तः सुदानवः ।
सरस्वन्तं हवामहे ॥
ये ते सरस्व ऊर्मयो मधुमन्तो घृतश्चुतः ।
तेभिर् नो ऽविता भव ॥
पीपिवांसं सरस्वत स्तनं यो विश्वदर्शतः ।
भक्षीमहि प्रजाम् इषम् ॥

7.096.01 You chant, Vasis.t.ha a powerful hymn to her who is the most mighty of rivers; worship, Vasis.t.ha with well-selected praises, Sarasvati_, who is both in heaven and earth. [Who is both in heaven and earth: as a goddess, or as eloquence or as river].

“I wish to sing a high word: (she is) the asuric one among rivers. Magnify indeed Sarasvati_ with songs, with praises, O Vasis.t.ha, and the world-haves.” Tr. Hale, W.E., Asura in Early Vedic Religion, p. 63; this interpretation seems to imply that Sarasvati_ is the lordly one among rivers and is associated with asuras.

7.096.02 Beautiful Sarasvati_, inasmuch as by your might men obtain both kinds of food, do you, our protectress, regard us; do you, the friend of the Maruts, bestow riches upon those who are affluent (in oblations). [Both kinds of food: ubhe andhasi_ = fires celestial and terrestrial; or if the reference is to food: gra_myam a_ran.yam va_, domestic and wild].

7.096.03 May the auspicious Sarasvati_ bestow auspicious fortune upon us; may the faultless-moving food-conferring (goddess) think of us; glorified (as you have been) by Jamadagni_, (be now) glorified by Vasis.t.ha.
7.096.04 Desiring wives, desiring sons, liberal of donations, approaching him, now worship Sarasvat.
7.096.05 With those your waves Sarasvat, which are sweet-tasted, the distributors of water, be our protector.
7.096.06 May we recline upon the protuberant breast of Sarasvati. Which is visible to all; that we may possess progeny and food. [May we recline: pi_piva_m.sam sarasvatas stanam: bhaks.i_mahi and stanam = means of cloud, megha; so, the r.ca is rendered: may we obtain the distend and loud-thundering (of breast-like) cloud of Sarasvat. Which is visible to all; (may we obtain) progeny and food].

इन्द्रो वा घेद् इयन् मघं सरस्वती वा सुभगा ददिर् वसु ।

त्वं वा चित्र दाशुषे ॥

चित्र इद् राजा राजका इद् अन्यके यके सरस्वतीम् अनु ।

पर्जन्य इव ततनद् धि वृष्ट्या सहस्रम् अयुता ददत् ॥

8.021.17 Is it Indra who has given to the donor (of the oblation) so much affluence? Is it the auspicious Sarasvati_ (who has given) the treasure? Or, Citra, is it you?
8.021.18 Verily the Ra_ja_ Citra, giving his thousands and tens of thousands, has overspread (with his bounty) those other petty princes, who rules along the Sarasvati_, as Parjanya (overspeads the earth) with rain.

आहं सरस्वतीवतोर् इन्द्राग्न्योर् अवो वृणे ।

याभ्यां गायत्रम् ऋच्यते ॥

8.038.10 I solicit the protection of Indra and Agni, associated with Sarasvati_, to whom this Ga_yatri_ hymn is addressed. [Associated with Sarasvati_: sarasvati_vatoh = possessors of praise].

सुशिल्पे बृहती मही पवमानो वृषण्यति ।

नोषासा न दर्शते ॥

उभा देवा नृचक्षसा होतारा दैव्या हुवे ।

पवमान इन्द्रो वृषा ॥

भारती पवमानस्य सरस्वतीळा मही ।

+इमं नो यज्ञम् आ गमन् तिस्रो देवीः सुपेशसः ॥

9.005.06 The pure-flowing (Soma) longs for the fair-formed wide-reaching mighty Night and Dawn not yet visible.
9.005.07 I invoke the two divine priests, the two deities who behold men-- the pure-flowing (Soma) is radiant and the showerer (of benefits). [The pure-flowing Soma is radiant: perhaps, an identification of Soma with Indra, just as in the next verse, Indu (i.e. Soma) is identified with Indra.
9.005.08 May the three beautiful goddesses, Bha_rati_, Sarasvati_, and mighty Il.a_, come to this our offering of the Soma.

ये सोमासः परावति ये अर्वावति सुन्विरे ।

ये वादः शर्यणावति ॥

य आर्जीकेषु कृत्वसु ये मध्ये पस्त्यानाम् ।

ये वा जनेषु पञ्चसु ॥

9.065.22 May those Soma juices which are effused at a distance of nigh or on this S'aryan.a_vat (lake). [S'aryan.a_vat = possessing sweet juice; reference to a lake in the western part of Kuruks.etra region. Harya_n.a may be a derivative from S’aryan.a_vat].
9.065.23 Or among the R.jikas, or the Kr.tvas, or in the neighbourhood of the rivers Sarasvati_, or in the five castes. [r.s.ayo vai sarasvatya_m satrama_sata: Aitareya Bra_hman.a 2.19; five castes: nis.a_das are added to make the number five].

पावमानीर् यो अध्येत्य् ऋषिभिः सम्भृतं रसम् ।

तस्मै सरस्वती दुहे क्षीरं सर्पिर् मधूदकम् ॥

9.067.32 For him who reads the hymns to Pavama_na, the essence (of the Veda) collected by the r.s.is, Sarasvati_ milks milk, ghee and exhilarating Soma. [Here follows a khila of 19 verses in praise of pavama_na hymns].

आ नः॑ सोम॒ पव॑मानः किरा॒ वस्व् इन्दो॒ भव॑ म॒घवा॒ राध॑सो म॒हः ।

शिक्षा॑ वयोधो॒ वस॑वे सु चे॒तुना॒ मा नो॒ गय॑म् आ॒रे अ॒स्मत् परा॑ सिचः ॥

आ नः॑ पूषा पव॑मानः सुरा॒तयो॑ मि॒त्रो ग॑च्छन्तु वरु॑णः स॒जोष॑सः ।

बृह॒स्पति॑र् म॒रुतो॑ वा॒युर् अ॒श्विना॒ त्वष्टा॑ सवि॒ता सु॒यमा॒ सर॑स्वती ॥

9.081.03 Soma, when purified, strew upon us wealth; Indu, who are possessed of affluence, be (the donor) of ample riches; dispenser of food, grant to Vasu prosperity through (your) intelligence, scatter not our riches far from us. [Our riches: no gayam, i.e., asmabhya_m pradeyam dhanam, the wealth to be bestowed on us].

9.081.04 May the generous (gods) meet together to us-- Pu_s.an, Pavama_na, Mitra, Varun.a, Br.haspati, the Maruts, Va_yu, the As'vins, Tvas.t.a_, savita_, and beautiful Sarasvati_. [Beautiful Sarasvati_: suvigraha, having a fair body].

सर॑स्वती दे॒वयन्तो॑ हवन्ते॒ सर॑स्वतीम् अध्व॒रे ता॒यमा॑ने ।

सर॑स्वती सु॒कृतो॑ अह्वयन्त॒ सर॑स्वती दा॒शुषे॒ वार्यं॑ दात् ॥

सर॑स्वति॒ या स॒रथं॑ य॒याथ॑ स्व॒धाभि॑र् देवि पि॒तृभि॒र् मद॑न्ती ।

आ॒सद्या॒स्मिन् ब॒र्हिषि॑ मादयस्वानमी॒वा इष॒ आ धे॑ह्य् अ॒स्मे ॥

सर॑स्वती॒ याम् पि॒तरो॒ हव॑न्ते दक्षि॒णा य॒ज्ञम् अ॑भि॒नक्ष॑माणाः ।

स॒ह॒स्रा॒र्घम् इ॒ळो अत्र॑ भा॒गं रा॒यस् पोषं॒ यज॑मानेषु धेहि ॥

आपो॑ अ॒स्मान् मा॒तरः॑ शुन्धयन्तु घृ॒तेन॑ नो घृत॒प्वः पुनन्तु ।

विश्वं॒ हि रि॒प्रम् प्र॒वह॑न्ति दे॒वीर् उद् इद् आ॑भ्य॒ः शुचि॒र् आ पू॒त ए॑मि ॥

10.017.07 The devout invoke Sarasvati; they worship Sarasvati_ at the strewn sacrifice; the virtuous call upon Sarasvati_; may Sarasvati_ bestow blessings upon the donor (of the oblation).

10.017.08 Divine Sarasvati_, who rides in the same chariot with the Pitr.s, and delighted (along with them) by the (sacrificial) viands, seated on the sacred grass gratified (by our offering, and grant us wholesome food.
10.017.09 Sarasvati_, whom the Pitr.s invoke when circumambulating sacrifice on the right, bestow upon the worshippers at this sacrifice a portion of food fit for thousands, and increase of riches.
10.017.10 May the maternal waters, purify us; may the shedders of water purify us with the effusion; for the divine (waters) bear away all sin; I come away from them purified (to heaven). [Shedders of water...with effusion: ghr.tena no ghr.tapvah punantu: waters which purify others by water; ghr.ta = effused water; ghr.tapvah = divinities presiding over effused water; or, ghr.ta = oiled butter (*Yajus*. 4.2); udemi = I go to heaven (*S'atapatha Bra_hman.a* 3.1.2.11)].

हिनोता नो अध्वरं देवयज्या हिनोत ब्रह्म सनये धनानाम् ।

ऋतस्य योगे वि ष्यध्वम् ऊधः श्रुष्टीवरीर् भूतनास्मभ्यम् आपः ॥

आपो रेवतीः क्षयथा हि वस्वः क्रतुं च भद्रम् बिभृथामृतं च ।

रायश् च स्थ स्वपत्यस्य पत्नीः सरस्वती तद् गृणे वयो धात् ॥

प्रति यद् आपो अदृश्रम् आयतीर् घृतम् पयांसि बिभ्रतीर् मधूनि ।

अध्वर्युभिर् मनसा सृलतविदाना इन्द्राय सोमं सुषुतम् भरन्तीः ॥

एमा अग्मन् रेवतीर् जीवधन्या अध्वर्यवः सादयता सखायः ।

नि बर्हिषि धत्तन सोम्यासो ऽपां नप्त्रा सृलतविदानास एनाः ॥

आग्मन्न् आप उशतीर् बर्हिर् एदं न्य् अध्वरे असदन् देवयन्तीः ।

अध्वर्यवः सुनुतेन्द्राय सोमम् अभूद् उ वः सुशका देवयज्या ॥

10.030.11 Direct our sacrifice to the worship of the gods; direct our adoration to the acquisition of wealth; open the udder on the occasion of (this) rite; be to us, waters, the givers of felicity. [The udder: u_dhas is the skin in which the Soma is contained (adhis.avanacarma); yoga = the cart on which Soma is placed; opoen the skin which is on (or below) the sacrificial cart (Nirukta 6.22:

u_dhasodhasta_davasthiteneti manyama_no niruktaka_ro bravi_ti-- ya_jn~e s'akat.a iti va_)].

10.030.12 Opulent waters, you rule over riches; you support good fortune, pious rites, and immortality; you are the protectresses of wealth and of offspring; may Sarasvati_ bestow all this opulence on him who praises you.

10.030.13 I behold you, waters, coming to (the sacrifice), conveying the butter, the water, the sweet (Soma); conversing mentally with the priests, and bringing the well-effused Soma for Indra.

10.030.14 These opulent and life-sustaining (waters) have come (to my sacrifice); friendly priests, make them sit down; place them on the sacred grass, you offerers of the Soma, conversing with the grandson of the waters.

10.030.15 The waters desiring (it) have come to this sacred grass, and wishing to satisfy the gods, have sat down at our sacrifice; express priests, the Soma for Indrra; for you the worship of the gods is easy.

अव द्वके अव त्रिका दिवश् चरन्ति भेषजा ।

क्षमा चरिष्णव् एककम् भरताम् अप यद् रपो द्यौः पृथिवि क्षमा रपो मो षु

ते किं चनाममत् ॥

10.059.09 Remedies come down from heaven by two and threes; one wanders singly in heaven; heaven and earth remove all iniquity; let heaven (take away) iniquity; may no ill ever approach you. [By twos and threes: by twos = by the two as'vins; by threes = three goddesses, il.a_, sarasvati_ and bha_rati_].

त्रिः सप्त सस्रा नद्यो महीर् अपो वनस्पतीन् पर्वताअग्निम् ऊतये ।

कृशानुम् अस्तॄन् तिष्यं सधस्थ आ रुद्रं रुद्रेषु रुद्रियं हवामहे ॥

सरस्वती सरयुः सिन्धुर् ऊर्मिभिर् महो महीर् अवसा यन्तु वक्षणीः ।

देवीर् आपो मातरः सूदयित्न्वो घृतवत् पयो मधुमन् नो अर्चत ॥

10.064.08 We invoke for protection the thrice seven flowing rivers, (their) great waters, the trees, the mountains, Agni, Kr.s'a_nu, the archers, and Tis.ya, to the assembly; (we invoke) Rudra, worthy of the praise of the Rudras, for the good of the praisers. [Kr.s'a_nu: the gandharva so named; the archers are the gandharvas accompanying him; they are the guardians, of the Soma; Tis.ya:

naks.atra, a heavenly-archer like Kr.s'a_nu? some of the other expressions denote the articles of sacrifice: the water, the ladles, the grinding stones, the Soma; for the good of the praisers: among the Rudras].

10.064.09 May the very great rivers, Sarasvati_, Sarayu, Sindhu, come with their waves for (our) protection; may the divine maternal animating waters grant us their water mixed with butter and honey. [Sarasvati_ is sindhu ma_ta_, the mother of streams; this description apparently denotes that Sarasvati_ was a river mightier than the Sindhu. "Sindhu in the R.gveda and the Atharvaveda often mean 'stream' merely (cf. sapta sindhavah), but it has also the more exact wsense of 'the stream' par excellence, the 'Indus'. This name is, however, rarely mentioned after the period of the sam.hitas, always then occurring in such a way as to suggest distance." (A.A. Macdonell and A.B.Keith, Vedic Index of Names and Subjects, Vol. II, Delhi, 1958, p. 450). Chattopadhyaya, however, feels that Sarasvati_ and Sindhu were synonymous. (K.C.Chattopa_dhya_ya, Rigvedic River Sarasvati_, *Journal of the Department of Letters*, Vol. XV, Calcutta; cf. B.R. Sharma, The Vedic Sarasvati_, *The Calcutta Review*, Vol. 112, No.1, July 1949, p. 58)].

अ॒ग्निर् इन्द्रो॒ वरु॑णो मि॒त्रो अ॑र्य॒मा वा॒युः पू॒षा सर॑स्वती स॒जोष॑सः ।

आ॒दि॒त्या विष्णु॑र् म॒रुतः॒ स्वर् बृ॒हत् सोमो॑ रु॒द्रो अदि॑तिर् ब्रह्म॑ण॒स् पतिः॑ ॥

10.065.01 Agni, Inda, Varun.a, Mitra, Aryaman, Va_yu, Pu_s.an, Sarasvati_, the A_dityas, Vis.n.u, the Maruts, the mighty heaven, Soma, Rudra, Aditi, Brahman.aspati with one consent.

पा॒वी॒रवी॑ तन्य॒तुर् एक॑पाद् अ॒जो दि॒वो ध॒र्ता सिन्धु॒र् आपः॑ समु॒द्रियः॑ ।

विश्वे॑ दे॒वासः॑ शृणव॒न् वचां॑सि मे॒ सर॑स्वती स॒ह धी॒भिः पुर॑न्ध्या ॥

10.065.13 May the armed and thundering (voice of mid-heaven), the upholder of heaven, Aja Ekapa_d, the ocean, the waters of the firmament, the universal gods and Sarasvati_, accompanied by sacred rites, and abundant wisdom, hear my words.

सर॑स्वान् धी॒भिर् वरु॑णो धृ॒तव्र॑तः पू॒षा विष्णु॑र् महि॒मा वा॒युर् अ॒श्विना॑ ।

ब्र॒ह्म॒कृतो॑ अ॒मृता॑ वि॒श्ववे॑दसः॒ शर्म॑ नो यंसन् त्रि॒वरू॑थ॒म् अंह॑सः ॥

10.066.05 May Sarasvati_, (endowed) with intelligences, Varun.a the observer of oblations, Pu_s.an, Vis.n.u, the mighty Va_yu, the As'vins, (may these) the bestowers of food upon worshippers, immortal, the possessors of all wealth, grant us a habitation triply-guarded from evil. [Triply-guarded: am.hasas, an epithet of the deities, the destroyers of enemies in the form of sin; s'arma trivaru_tham = a house with three courts, or the hall of sacrifice, containing the three Soma vessels, dron.a, a_havani_ya and pu_tabhr.t].

तिस्रो देवीर् बर्हिर् इदं वरीय आ सीदत चकृमा वः स्योनम् ।

मनुष्वद् यज्ञं सुधिता हवींषीळा देवी घृतपदी जुषन्त ॥

10.070.08 Sit down, you three goddesss, upon this broad barhis, we have spread it out for you; Il.a_, radiant (Sarasvati_) and bright-footed (bha_rati_) accept our sacrifice and well-presented oblations as if they were Manu's.

r.s.i: sindhuks.it praiyamedha; devata_: nadi_ samu_ha; chanda: jagati_

प्र सु व आपो महिमानम् उत्तमं कारुर् वोचाति सदने विवस्वतः ।

प्र सप्त-सप्त त्रेधा हि चक्रमुः प्र सृत्वरीणाम् अति सिन्धुर् ओजसा ॥

प्र ते ऽरदद् वरुणो यातवे पथः सिन्धो यद् वाजाअभ्य् अद्रवस् त्वम् ।

भूम्या अधि प्रवता यासि सानुना यद् एषाम् अग्रं जगताम् इरज्यसि ॥

दिवि स्वनो यतते भूम्योपर्य् अनन्तं शुष्मम् उद् इयर्ति भानुना ।

अभ्राद् इव प्र स्तनयन्ति वृष्टयः सिन्धुर् यद् एति वृषभो न रोरुवत् ॥

अभि त्वा सिन्धो शिशुम् इन् न मातरो वाश्रा अर्षन्ति पयसेव धेनवः ।

राजेव युध्वा नयसि त्वम् इत् सिचौ यद् आसाम् अग्रम् प्रवताम्

इनक्षसि ॥

इमम् मे गङ्गे यमुने सरस्वति शुतुद्रि स्तोमं सचता परुष्ण्य् आ ।

असिक्न्या मरुद्वृधे वितस्तयार्जीकीये शृणुह्या सुषोमया ॥
तृष्टामया प्रथमं यातवे सजूः सुसर्त्वा रसया श्वेत्या त्या ।
त्वं सिन्धो कुभया गोमतीं क्रुमुम् मेहत्न्वा सरं याभिर् ईयसे ॥
ऋजीत्य् एनी रुशती महित्वा परि ज्रयांसि भरते रजांसि ।
अदब्धा सिन्धुर् अपसाम् अपस्तमाश्वा न चित्रा वपुषीव दर्शता ॥
स्वश्वा सिन्धुः सुरथा सुवासा हिरण्ययी सुकृता वाजिनीवती ।
ऊर्णावती युवतिः सीलमावत्य् उताधि वस्ते सुभगा मधुवृधम् ॥
सुखं रथं युयुजे सिन्धुर् अश्विनं तेन वाजं सनिषद् अस्मिन्न् आजौ ।
महान् ह्य् अस्य महिमा पनस्यते ऽदब्धस्य स्वयशसो विरप्शिनः ॥

10.075.01 Waters, the worshipper addresses to you excellent praise in the dwelling of the institutor of the rite; they flowed by sevens through the three (worlds); but the Sindhu surpasses (all) the (other) streams in strength.
10.075.02 For your course, Sindhu, Varun.a tore open a path, since you hastened towards food; you go by a lofty road down upon the earth, by which (road) you reign in the sight of all worlds.
10.075.03 The sound goes forth in heaven above the earth; (Sindhu) with shining wave animates his endless speed; as rains issue thundering from the cloud, so Sindhu (thunders) when he advances roaring like a bull.
10.075.04 Like mothers crying for their sons, (the other rivers) hasten towards you, Sindhu, like cows with their milk; you lead your two wings like a king going to battle when you march in the van of the streams that are descending (with you). [Your two wings: your flowing combatants; or, wings of an army].
10.075.05 Accept this my praise, Gan:ga_, Yamuna_, Sarasvati_, S'utudri, Parus.n.i, Marudvr.dha with Asikni_, and Vitazsta_; listen, A_rjiki_ya with Sus.oma_. [Gan:ga_...: cf. Roth's Lit. and Hist. of the Veda, pp. 136-140; Parus.n.i is another name for Ira_vati_. Marudvr.dha = increased by the Maruts or storm-gods; A_rjiki_ya = Vipa_s'a; Sus.oma_ = Sindhu; Nirukta 2.26; cf. Muir's Sanskrit Texts, vol. 2, p. 355; a verse is inserted here in some MSS, not noticed by Sa_yan.a: "Those who are drowned at the confluence of the Sita and

Asita go to heaven; the resolute people who abandon their lives (thus) enjoy immortality"].
10.075.06 You, Sindhu, in order to reach the swift-moving Gomati_, have united, yourself first with the Tr.s.t.a_ma_; (now be united) with the Susartu, the Rasa_, the S'veti, the Kubha, and the Mehatnu, in conjunction with which streams you do advance. [In conjunction with: saratham = lit. having mounted the same chariot with them].
10.075.07 Straight-flowing, white-coloured, bright-shining (Sindhu) bear along in its might the rapid waters; the inviolable Sindhu, the most efficacious of the efficacious, is speckled like a mare, beautiful as a handsome woman.
10.075.08 The Sindhu is rich in horses, rich in chariots, rich in clothes, rich in gold ornaments, well-made, rich in food, rich in wool, ever fresh, abounding Si_lama_ plants, and the auspicious river wears honey-growing (flowers). [Rich in wool: of which, blankets are made; si_lama_ plants: which furnish cordage for fastening ploughs].
10.075.09 Sindhu has harnessed his easy-going, well-horsed, chariot, with it may he bring (us) food; the might of this inviolable, great, renowned (chariot) at this sacrifice is praised as mighty.

समङ्‌ अञ्जन्तु विश्वे देवाः समङ्‌ आपो हृदयानि नौ ।

समङ्‌ मातरिश्वा सं धाता समङ्‌ उ देष्ट्री दधातु नौ ॥

10.085.47 May the universal gods unite both our hearts; may the waters unite them; may Ma_taris'van, Dha_ta_ and the bountiful (Sarasvati_) unite both our hearts. [May the god of love, may the divine instructress, unite us (samuddes.t.ri_ = sam u des.t.ri_). At the end of this r.ca, the following khila occurs: 1. May you not be a widow for a hundred years, but for more than that may you be an obedient wife, faithful to your vows, and radiant, and illustrious; 2. May she bear many sons, and nowhere meet with misfortune; may your husband, drinking Soma, ever be devoted to duty; 3. Be the mother of eight sons, be beloved by and faithful to your husband ever delighting the hearts of your husband, father and brother; 4. As Indra_n.i_ is to Indra, as S'ri to Vis.n.u, as Gauri_ to S'an:kara, so be you to your husband; 5. As Anasu_ya_ is to Atri, as Arundhati_ to Vasis.t.ha, as Sati_ to Kaus'ika, so be you too to your husband; 6. Be confident, be cherished; Br.haspati has given you to me; being made the mother of progeny by me your husband, live with (me) a hundred years.]

आ नो॑ य॒ज्ञम् भार॑ती॒ तूय॑म् ए॒त्व् इळा॑ मनु॒ष्वद् इ॒ह चे॒तय॑न्ती ।
ति॒स्रो दे॒वीर् ब॒र्हिर् एदं स्यो॒नं सर॑स्वती॒ स्वप॑सः सदन्तु ॥

10.110.08 May Bha_rati_ come quickly to our sacrifice, and Il.a_ thinking (of what she has to do), like a human being; may Sarasvati_ also-- the three gracious goddesses, sit down upon this pleasant sacred grass.

पु॒त्रम् इ॑व पि॒तरा॑व् अ॒श्विनो॒भेन्द्रा॒वथुः॒ काव्यै॑र् दं॒सना॑भिः ।
यत् सु॒राम॒ं व्य् अपि॑बः॒ शची॑भिः॒ सर॑स्वती त्वा मघवन्न् अभिष्णक् ॥

10.131.05 Both the As'vins defended (you), Indra, like two fathers (defending) a son with glorious exploits; when (triumphing) through the deeds of valour, you drank the grateful libation, Sarasvati_ approached you, O Maghavat. [*Yajus*. 10.34].

प्र नो॑ यच्छत्व् अर्य॒मा प्र भगः॒ प्र बृ॒हस्पतिः॑ ।
प्र दे॒वाः प्रोत सू॒नृता॑ रा॒यो दे॒वी द॑दातु नः ॥

10.141.02 May Aryaman, may Bhaga, may Br.haspati, may the gods give liberally to us; may the truth-speaking goddess (Sarasvati_) bestow riches upon us.

इ॒न्द्र॒वा॒यू बृ॒हस्पतिं॑ सु॒ह॒वे॒ह ह॑वामहे ।
यथा॑ नः॒ सर्व॒ इज् जनः॒ सृल॑तग॑त्यां सु॒मना॒ अस॑त् ॥

10.141.04 We invoke the adorable Indra and Va_yu and Br.haspati on this occasion, that all our race may be favourably inclined to us in the acquisition (of wealth).
10.141.05 Stimulate to liberality Aryaman, Br.haspati, Indra, Va_ta, Vis.n.u, Sarasvati_, and the food-bestowing Savita_.

गर्भं॑ धेहि सिनीवालि॒ गर्भं॑ धेहि सरस्वति ।
गर्भं॑ ते अ॒श्विनौ॑ दे॒वाव् आ ध॑त्ता॒म् पुष्क॑रस्रजा ॥

10.184.02 Sustain the embryo, Sini_va_li, sustain the embryo, Sarasvati_, may the divine As'vins, garlanded with lotuses, sustain your embryo.

Sarasvati in the Yajurveda

(Va_jasneyi, ma_dhyandina, s'ukla) [Based on RTH Griffith's translation]

> **a_grayan.as'ca me vais'vadevas'ca me dhruvas'ca me vais'va_naras'ca me aindra_gnas'ca me maha_vais'vadevas'ca me marutvati_ya_s'ca me nis.kevalyas'ca me sa_vitras'ca me sa_rasvatas'ca me pa_tni_vatas'ca me ha_riyojanas'ca me yajn~ena kalpanta_m**

18.20 [Sets of oblations called Grahas are referred to with their respective formulas enumerating pairs of Soma cups and sets of sacrificial implements. Most of the Soma cups or libations are also mentioned in 7.1-39]. May my a_grayan.a and my Vais'vadeva, and my Dhruva and my Vais'va_nara, and my Aindra_gna and my Maha_vais'vadeva and my Marutvati_ya and my Nis.kevalya and my Sa_vitra and my Sa_rasvata, and my Pa_tni_vata and my Hari_yojana prosper my sacrifice. [Sa_rasvata is the sa_rasvata graha or a set of oblation or a cup of the soma, thus referring to the cup made of waters of the Sarasvati_ as a source of strength (upaya_m agr.hi_to sya_ s'vi_nam tejah sa_rasvatam vi_ryyam aindram balam: Mahi_dhara on Yajus. 19.8: sa_rasvatam sarasvati_ sambandhi vi_ryam sa_marthyam aindram indrasambandhi balam). Mahi_dhara notes: abhis.ecani_ye sa_rasvati_na_m apa_m grahan.am eva sa_rasvati_ grahah sa_rasvatam graham gr.hn.a_ti_ti tatra_mna_na_t, thus understanding the sa_rasvata as the waters of the Sarasvati_ river].

Association of Sarasvati_ with the waters is emphatic in the following hymns of the Yajurveda dealing with the ra_jasu_ya ceremony while collecting and mixing of waters from different streams and sources for the abhis.eka (aspersion or consecration of a king).

> **apo deva_ madhbumati_ragr.bhn.annu_rjasvati_**
> **ra_jasvas'cita_na_h**
> **ya_bhirmitra_varun.a_vabhyas.is'canya_bhirindramanayannatyar a_ti_h**

10.1 The Gods drew waters with their store of sweetness, succulent and observant, king-creating, wherewith they sprinkled Varun.a and Mitra, wherewith they guided Indra past his foemen. [The Adhvaryu first takes water

brought from the Sarasvati_, the sacred river and recites the text, while mixing water taken from a tank or pool; Varun.a and Mitra, as kings, are predecessors of Indra.]

In the contextg of preparing waters for consecration, the Bra_hman.as note:

> **sarasvati_rive prathana_ gr.hnati—ta_bhi_rabhisin~cati sarasvati_ va_caivainametadabhis.in~cati**

He first takes water from the river Sarasvati_… There with he sprinkles him—Sarasvati_ being the goddess of speech it is with speech he thereby sprinkles him. (Aitareya Bra_hman.a 1.28,3,15; 6,36; S'atapatha Bra_hman.a 8.3,2.16)

Another reference elaborates on the use of Sarasvati_ river waters:

> **na juhoti sa_rasvati_s.u…atha yat sarasvati_s.u na juhoti va_gvai sarasvati_ vajra a_jyaned vajrenojyena va_caim hinasa_niti taswma_t sa_rasvati_s.u na juhoti**

He does not offer on the waters from the Sarasvati_…And as to why he does not offer on the water from the Sarasvati_…Sarasvati_ to be sure, is (the goddess of) speech, and the ghee is the thunderbolt. Lest I should injure (the goddess of) speech. Thus (he thinks and therefore) he does not offer on the water from the Sarasvati_… (S'atapatha Bra_hman.a 5.3.4.3).

Devi_ Bha_gavatam, P-Skandaha, 9.6-7 relates the legend of the descent of Sarasvati_ from the heavens in the form of a river.

The following hymns refer to Sarasvati_ as a river.

> **pan~ca nadyah sarasvati_mapi yanti sasrotasah**
> **sarasvati_ tu pan~cadha_ so des'ebhavatsarit**

34.11Five rivers flowing on their way speed onward to Sarasvati_, but then became Sarasvati_ a fivefold river in the land.

34.24-27 are taken from RV. 1.35.8-11.

According to Lassen and Ludwig the seven rivers (sapta sindhu_n) refer to: Indus, Vitasta_, Asikni_, parus.n.i_, vipa_sa, s'utudri_ and kubha_. In an earlier hymn (34.11), Sarasvati_ is described as a river with five tributaries.

Adoring Sarasvati_ as a goddess, Yajurveda refers to her as yas'obhaginya_, one enriched with glory or one who is va_k, goddess fo speech who will make children famous (2.20).

indras'ca samra_d. varun.as'ca ra_ja_ tau te bhaks.am cakraturagra etam
tayorahamanu bhaks.am bhaks.aya_mi va_gdevi_ jus.a_n.a_ somasya tr.pyatu saha pra_n.ena sva_ha_

8.37 Indra chief lord and Varun.a the sovereign have made this draught of thine the first and foremost. I, after, drink their draught. May she, the Goddess of Speech (Sarasvati_), rejoppicing, sate herself with Soma—All hail!—with Pra_n.a (the genius of vital breath) as her feast-companion.

is.e ra_ye ramasva sahase dyumna u_rje apatya_ya
samra_d.asi svara_d.asi sa_rasvatau tvotsau pra_vata_m

13.35 Take you your ease for food, for store of riches, for might in splendour, and for strength and offspring. You are all-ruling, independent ruler; both fountains of Sarasvati_ protect thee! (According to Mahi_dhara, the two fountains are: Mind and Speech].

In this context, it will be apposite to recall that A_s'vala_yana Gr.hyasu_tra invokes Sarasvati_ to give intelligence to the newborn child (1.15.2); Sarasvati_, promote this (our understanding), gracdious one, the beautiful one than whom we sing first of all, that is in whom what is, has been born, in whom this world dwells. (2.4.8).

Va_k is referred to as the controller of Sarasvati_ :

devasya tva_ savituh prasaves'vinorba_hubhya_m pu_s.n.o hasta_bhya_m
sarasvatyai va_co yanturyantren.a_gneh
sa_mra_jyena_bhis.in~ca_mi

18.37 You by the radiant Savitar's impulsion, with arms of As'vins, with the hands of Pu_s.an. Controlled by Va_k Sarasvati_'s controller, with Agni's sole dominion I besprinkle. [Or, by the support of Sarasvati_'s Va_k, the supper].

Va_k as Sarasvati_ is also referred to as a Physician, together with the As'vins. In Yajus. 20.3, the term used is: sarasvatyai bhais.ajyena, that is, with the healing powers of Sarasvati_, the Adhvaryu besprinkles the sacrificer with libations of fat:

deva_ yajn~amatanvatga bhes.ajam bhis.aja_s'vina_
va_ca_ sarasvati_ bhis.agindra_yendriya_n.i dadhatah

[The sprinkling of the waters of Sarasvati_ is done as though the sprinkling is done with speech, Va_k: S'B 5.3.4.3; 5.8].

19.12 The As'vins, the Physicians, Gods, stretched out the healing sacrifice; Sarasvati_ with speech was a Physician, all with heroic powers investing Indra.

Together with the As'vins, Sarasvati_ waters are used in the processing of purchased Soma:

somasya ru_pam kri_tasya parisrutpari s.icyate
as'vibhya_m dugdham bhes.ajamindra_yaindram sarasvatya_

19.15 Emblem of purchased Soma is Parisrut (a kind of fermented concoction of herbs), foaming drink effused; Indra's balm milked for Indra by the As'vins and Sarasvati_.

sarasvati_ manasa_ pes'alam vasu na_satya_bhya_m vayati dars'atam vapuh
rasam parisruta_ na rohitam nagnahurdhi_rastasaram na vema

19.83 By thought Sarasvati_ with both Na_satyas forms lovely treasure and a beauteous body; like shuttle through the loom the steady ferment mixes the red juice with the foaming sp;irit. [Ferment: nagnahu, the root used as yeast].

devi_ jos.t.i_ sarasvatyas'vinendramavardhayan
s'rotram na karn.ayoryas'o jos.t.ri_bhya_m dadhurindriyam
vasuvane vasudheyasya vyantu yaja

21.51 Both nursing Goddesses, the Pair of As'vins and Sarasvati_ have with both nurses given strength to Indra, fame, and power to hear. For gain of wealth let them enjoy. Thou, Hotar, offer sacrifice. [Both nursing goddesses: heaven and earth; or, day and night].

> **hota_ yaks.attisro devi_rna bhes.ajam trayastridha_tavopaso ru_pamindre hiran.ya yamas'vined.a_ na bha_rati_ va_ca_ sarasvati_ maha indra_ya duha indriyam payah somah parisruta_ ghr.tam madhu vyantva_jyasya hotaryaja**

20.37 Let the Hotar worship the three Goddesses. The three active ones, with three sacrificial elements, lay balm and golden hue on Indra. The As'vins, Id.a_, bha_rati_-- Sarasvati_ with Speech yields might and power to Indra. Milk, Soma. Let them enjoy. [Three active ones: the goat, the ram and the bull which are offered respectively to As'vins, Sarasvati_ and Indra. See 21.46 and 47 where the term used is: sarasvatya_ mes.asya havis.ah, that is, of Sarasvati_, of the ram the sacrifice].

Yajus. says Hail! to Sarasvati_ as the purifier and as the great one, using the phrases: sarasvatyai sva_ha_; sarasvatyai pa_vaka_yai sva_ha_; sarasvatyai br.hatyai sva_ha_ (22.20). She is hailed as: sarasvati_ nah subhaga_ mjayaskarat, may Sarasvati_, auspicious, grant felicity (25.16). The three goddesses, Id.a_, Sarasvati_ and Bha_rati_ are called mahi_ gr.n.a_na_, the Mighty glorified with song of prayer and devotion. Further elaborating on the attributes of the three goddesses, Yajus. 28.18:

> **devi_stisrastisro devi_h patimindramavardhayan**
> **aspr.ks.adbha_rati_ divam rudraiyajn~am sarasvati_d.a_**
> **vasumati_ gr.ha_n vasu vane vasudheyasya vyantu yaja**

28.18 Goddesses three, three goddesses have heightened their lord Indra's strength. One, Bha_rati_ has touched the sky. Sarasvati_ the sacrifice with Rudra, and enriched with wealth. Id.a_ the home-steads of the folk. For gain of wealth let them enjoy. Pay sacrifice.

Sarasvati_ is aligned with Rudras, Bha_rati_ with A_dityas and Id.a_ with the Vasus (Yajus. 29.8):

a_dityairno bha_rati_ vas.t.u yajn~am sarasvati_ saha rudrairna a_vi_t
id.opahu_ta_ vasubhih sajos.a_ yajn~am no devi_ramr.tes.u dhatta

29.8 Bha_rati_, with A_dityas love our worship! Sarasvati_ with Rudras be our helper; Id.a_ in accord, invoked with Vasus! Goddesses, place our rite among the Immortals.

Bha_rati_ and Id.a_ are fellows of Sarasvati_, the principal goddess (Yajus. 29.33):

A`_ no yajn~am bha_rati_ tu_yametvid.a_ manus.vadiha cetayanti_
tisro devi_rbarhiredam syonam sarasvati_ svapasah sadantu

29.33: Let Bha_rati_ come quickly to our worship, and Id.a_ showing like a human being; so let Sarasvati_ and both her fellows, deft Goddesses, on this fair grass be seated.

Sautra_man.i is a sacrifice performed in honour of Indra (Sutra_man) offering Indra the Soma and driving away the evil effects of excessive imbibing of Soma. In this sacrifice, Sarasvati_ together with the As'vins acts as a physician. The As'vins and Sarasvati_ provide Indra with a thunderbolt of foam (apa_m phenena namuceh s'irah indra udaavartayat—RV. 2.14.5, Sa_yan.a's commentary); with this thunderbolt of foam Indra strikes the head of the Asura and regains his strength. (Va_jasneyi Sam.hita_ 10.33, Mahi_dhara's commentary). In this process, As'vins are the store of Soma (havirdha_nam) and Sarasvati_ is the sacred hearth (agni_dhram, the receptacle for keeping the sacred fire) (Yajus. 19.18: havirdha_nam yadas'vina_gni_dhram yatsarasvati_ indra_yaindram sadaskr.tam patni_s'a_lam ga_rhapatyah: The As'vins are the Soma store; Sarasvati_ the sacred hearth; for Indra formed is Indra's seat, the matrons' hall, the house-lord's fire). Sarasvati_ and As'vins built up the body of Indra. (as'vina_ yajn~am savita_ sarasvati_ indrasya ru_pam varun.o bhis.ajyam—Yajus. 19.80). Sarasvati_ made the interior part of Indra (sarasvati_ vayati pes'o antaram—Yajus. 19.82). Sarasvati_ along with Agni was assisted by the Na_satyas to create the beautiful body of Indra. (sarasvati_ manasa_ pes'alam vasu na_satya_bhya_m vayati dars'atam vapuh—Yajus. 19.83). Sarasvati_

created Indra's breath (vya_na) with upava_ka; and nose hairs with badara. (avirna mes.o nasi vi_rya_ya pra_n.asya pantha_ amr.to graha_bhya_m sarasvatyupava_kairvya_nam nasya_ni barhirbadarairjaja_na—Yajus. 19.90; the sheep, the ram to give his nostril vigour, the immortal path of breath by both libations; by Indra-grains and sacrificial jujubes Sarasvati_ produced through-breath and nose hairs.) The As'vins, phyusicians, joined Indra's limbs and body; Sarasvati_ put limbs and frame together; giving the form and vital power of Indra, hundredfold, deathless and delightful luster. (Yajus. 19.93: an:ga_nya_tman bhis.aja_ tadas'vina_tma_naman:gaih samadha_t sarasvati_ indrasya ru_pam s'atama_nama_yus'candren.a jyotiramr.tam dadhana_h). Sarasvati_ and As'vins poured the splendour of victims, powerful oblation, honey and meath with milk and foaming liquor, healing Sarasvati_ effused, and As'vins; from pressed and unpressed Soma, deathless Indu. Thus was soma produced. (Yajus. 19.95: tejah pas'u_na_m havirindriyavat parisruta_ payasa_ sa_ragham madhu as'vibhya_m dugdham bhis.aja_ sarasvatya_ suta_suta_bhya_mamr.tah soma induh). Sarasvati yields medicine for the As'vins in this process: Let the hotar worship the doors, the regions, the resounding, expansive doors, the regions, with the as'vins, Indra milks the two milky worlds. The cow Sarasvati_ yields medicine for the As'vins and Indra, pure light and strength. Milk, So9ma. Let them enjoy sweet butter with foaming liquor. Hotar, present offerings of butter. (hota_ yaks.addaro dis'ah kavas.yo na vyacasvati_ras'vibhya_m na duro dis'a indro na rodasi_ dughe duhe dhenuh sarasvatyas'vinendra_ya bhes.ajam s'ukram na jyotirindriyam payah somah parisruta_ ghr.tam madhu vyantva_jyasya hotaryaja (Yajus. 20.34).

While continuing Sautra_man.i_, an a_sandi_ or sacrificer's seat representing a throne is placed between the two altars, a black antelope's skin is spread over it on which the sacrificer sitgs and recites the formulas to a_sandi.

Samiddho agniras'vina_ tapto gharmo vira_t sutah
Duhe dhenuh sarasvati_ somam s'ukramihendriyam

20.55 Fire has been kindled, As'vins Twain! The gharma warmed, the radiant pressed, here the milch-cow Sarasvati_ has poured bright Soma, Indra's own. [The radiant is a reference to the ruler or the prince Soma. Fourteen propitiatory verses follow in praise of the As'vins and Sarasvati_. According to S'atapatha Bra_hman.a V.5.4.16, Sarasvati_ here is Va_k, Speech, the healing Word. Prof. Weber suggests the rationalistic explanation that Sarasvati_ the

river, that is, cold water (amr.tam in the waters, in the waters healing medicine – RV 5.1.23) is referred to.

20.56-69 When Soma flows Sarasvati_ and both the As'vins, Leeches and Body-guards, bear to Indra strength by passage through the realms of air.
When Soma flowed the As'vins Twain, the Leeches, brought sweet medicine, with men's desire Sarasvati_ for Indra, Soma Nagnahu.
Worshipped, Sarasvati_ bestowed on Indra senses, manly power, the As'vins, through oblations paid, combined food, energy and wealth.
The As'vins brought from Namuci pressed Soma brightg with foaming juice. Sarasvati_ with sacred grass brought that to Indra for his drink.
Sarasvati_ and Indra with the As'vins Twain milked out desires from heaven and earth, the regions, the resounding and expansive doors.
Ye As'vins, Dawn and Night, by day and in the evening, fair of hue, accordant with Sarasvati_, deck Indra with surpassing powers.
Guard us, As'vins, through the day, guard us by night, Sarasvati_. Celestial Hotars, Leeches!! Both guard Indra when the juice is pressed.
The As'vins and the Three, apart, Sarasvati_, Id.a_, Bha_rati_, as drink to gladden Indra, poured strong Soma with the foaming juice.
The As'vins, our Sarasvati_ and Tvas.t.ar, when the juice was shed. Gave Indra balm, yes, mead as balm, glory and fame and many a shape.
Praising with foaming juice at due times, Indra, Vanaspati, Sarasvati_ as cow gave forth sweet beverage (kila_la) with the As'vins Twain.
As'vins, to Indra ye with cows, with Ma_sara and foaming drink gave, with Sarasvati_-- All hail! – the pressed out Soma juice and mead.
The As'vins and Sarasvati_ by wit from fiendish Namuchi brought unto Indra sacred food, strength, brilliant treasure, ample wealth.
That Indra, strong through sacrifice by As'vins and Sarasvati_, cleft Vala (the rain-withholding cloud) through to win him wealth, with Namuci of Asura birth.
Supporting him in sacrifice with sacred food and mighty powers, Sarasvati_, both As'vins and the cattle hymned that Indra's praise.

20.73-76 With cows the As'vins, mighty power, with horses manly vigour, strength, with sacred food Sarasvati_ made Indra, Sacrificer, strong.
May those Na_satyas (As'vins), fair of form, the men who ride paths of gold, oblation-rich Sarasvati_, thou, Indra! Help us in our rites.
Those Leeches righteous in their deeds. She, rich in milk, Sarasvati_, that Vr.tra-slayer hundred-powered, invested Indra with his might.

Ye As'vins and Sarasvati_, joint drinkers of the Soma draught, in Namuci of Asura birth, give aid to Indra in his deeds.

20.80 The As'vins gave, with luster, sight, Sarasvati_ manly strength with breath. Indra with voice and might gave Indra vigorous power.

20.84-89 These hymns are taken from R.gveda 1.3.10-12, 4-6.

as'vina_ pibata_m madhu sarasvatya_ sajopasa_
Indrah sutra_ma_m vr.traha_ jus.anta_m somyam madhu

20.90 Accordant with Sarasvati_ let the two As'vins drink the Soma. May Indra, Vr.tra-slayer, good Guardian, accept the Soma.

Sarasvati as Va_k

In the Bra_hman.as, va_k is equated with Sarasvati_.

R.gveda (10.71) describes in extenso, the identity of Va_k.

r.s.i: br.haspati a_n:girasa; devata_: jn~a_na; chanda: tris.t.up, 9 jagati_

बृहस्पते प्रथमं वाचो अग्रं यत् प्रैरत नामधेयं दधानाः ।

यद् एषां श्रेष्ठं यद् अरिप्रम् आसीत् प्रेणा तद् एषां निहितं गुहाविः ॥

सुम् इव तितऽउना पुनन्तो यत्र धीरा मनसा वाचम् अक्रत ।

अत्रा सखायः सख्यानि जानते भद्रैषां लक्ष्मीर् निहिताधि वाचि ॥

यज्ञेन वाचः पदवीयम् आयन् ताम् अन्व् अविन्दन्न् ऋषिषु प्रविष्टाम् ।

ताम् आभृत्या व्य् अदधुः पुरुत्रा तां सप्त रेभा अभि सं नवन्ते ॥

उत त्वः पश्यन् न ददर्श वाचम् उत त्वः शृण्वन् न शृणोत्य् एनाम् ।

उतो त्वस्मै तन्वं वि सस्रे जायेव पत्य उशती सुवासाः ॥

उत त्वं सख्ये स्थिरपीतम् आहुर् नैनं हिन्वन्त्य् अपि वाजिनेषु ।
अधेन्वा चरति माययैष वाचं शुश्रुवाअफलाम् अपुष्पाम् ॥
यस् तित्याज सचिविदं सखायं न तस्य वाच्य् अपि भागो अस्ति ।
यद् ईं शृणोत्य् अलकं शृणोति नहि प्रवेद सुकृतस्य पन्थाम् ॥
अक्षण्वन्तः कर्णवन्तः सखायो मनोजवेष्व् असमा बभूवुः ।
आदघ्नास उपकक्षास उ त्वे ह्रदा इव स्नात्वा उ त्वे ददृश्रे ॥
हृदा तष्टेषु मनसो जवेषु यद् ब्राह्मणाः संयजन्ते सखायः ।
अत्राह त्वं वि जहुर् वेद्याभिर् ओहब्रह्माणो वि चरन्त्य् उ त्वे ॥
इमे ये नार्वाङ् न परश् चरन्ति न ब्राह्मणासो न सुतेकरासः ।
त एते वाचम् अभिपद्य पापया सिरीस् तन्त्रं तन्वते अप्रजज्ञयः ॥
सर्वे नन्दन्ति यशसागतेन सभासाहेन सख्या सखायः ।
किल्बिषस्पृत् पितुषणिर् ह्य् एषाम् अरं हितो भवति वाजिनाय ॥
ऋचां त्वः पोषम् आस्ते पुपुष्वान् गायत्रं त्वो गायति शक्वरीषु ।
ब्रह्मा त्वो वदति जातविद्यां यज्ञस्य मात्रां वि मिमीत उ त्वः ॥

10.071.01 That, Br.haspati, is the best (part) of speech which those giving a name (to objects) first utter; that which was the best of those (words) and free from defect, (Sarasvati_) reveals it though secretly imparted, by means of affection. [Deity Jn~a_na: The knowledge of Brahman is identical with the study of the Veda, essential to divine knowledge; Thos...first utter: this refers to children's first utterances; Br.haspati says this to himself with a smile, having noticed that children know the meaning of the Veda: *Aitareya Bra_hman.a* 1.14; Best of those words: tat = that knowledge of the Veda].

10.071.02 When the wise create Speech through wisdom winnowing (it) as (men winnow) barley with a sieve, then friends know friendship; good fortune is placed upon their word. [Friendship: sakha_yah: sa, khya, sama_nakhya_na_ = stus.e, who possess knowledge of the s'a_stras].
10.071.03 (The wise) reached the path of Speech by sacrifice, they found it centred in the r.s.is; having acquired it they dispersed it in many places; the seven noisy (birds) meet together. [Birds: the seven metres, ga_yatri_ etc.; dispersed: the diiffusion of learning; those who have studied the Veda have taught it ot others].
10.071.04 One (man) indeed seeing Speech has not seen her; another (man) hearing her has not heard her; but to another she delivers her person as a loving wife well-attired presents herself to her husband. [But to another: i.e., he understands thoroughly the meaning of the Veda].
10.071.05 They call one man firmly established in the friendship (of Speech), they do not exclude him from (the society of) the powerful (in knowledge); another wanders with an illusion that is barren, bearing Speech that is without fruit, without flowers.
10.071.06 He who has abandoned the friend who knows the duty of a friend, in his speech there is not a particle (of sense); what he hears, he hears amiss; for he knows not the path of righteousness. [Duty of a friend: sacividam = the teacher who is the friend of the Veda because he shows his gratitude to the Veda by preventing the destruction of tradition; he hears amiss: what he hears outside (contrary to) the Veda he hears false].
10.071.07 Friends possessing eyes, possessing ears, were (yet) unequal in mental apprehension; some seemed like pools reaching to the mouth, others reaching to the loins, others like pools in which one can bathe. [Friends: persons having equal knowledge].
10.071.08 Although Bra_hman.as who are friends concur in the mental apprehensions which are conceived by the heart (of the wise), yet in this (assembly) they abandon one man (to ignorance of the sciences) that are to be known, others again who are reckoned as Bra_hman.as (wander at will in the meanings of the Veda). [Bra_hman.a: who possess the investigated Brahman, consisting of knowledge, divine lore (s'ruti), thought and wisdom, i.e., the learned].
10.071.09 Those who do not walk (with the Bra_hman.as) in this lower world not (with the gods) in the upper world-- they are neither Bra_hman.as nor offerers of libations; they, devoid of wisdom, attaining Speech, having sin producing (Speech), becoming ploughmen pursue agriculture. [Those who not walk: arva_k, paras: behind -- in front].

10.071.10 All frinends rejoice when the friendly (libation), the support of the assembly (of the priests), has arrived (at the sacrifice); for (Soma), the remover of iniquity, the giver of sustenance, being placed (in the vessels), is sufficient for their invigoration.
10.071.11 One (the Hota_) is diligent in the repitition of the verses (of the R.k); another (the Udga_ta_) chants the Ga_yatra (the Sa_man) in the S'akvari_ metre; another the Brahma declares the knowledge of what is to be done; another (the Adhvaryu) measures the materials of the sacrifice.

In this su_kta, the commentator notes that Br.haspati created Va_k. Sarasvati_ who is also va_k is the creation of Br.haspati. In the third hymn, the r.s.is are credited with the first procured speech and later transferring the speech to wise men for wider use.

Using this Rigvedic su_kta as the basis, Aitareya A_ran.yaka notes (3.1.6): va_ca_ vai veda_h sandhi_yante va_ca_ chanda_m.si…va_ca_ sarva_n.i…va_g vai ma_ta_ pra_n.ah putrah. Va_k is divine; she gave the Vedas and contained the entire universe within herself; she is mother and she has breath as her son. Va_caspati is the lord of Va_k (Aitareya Bra_hman.a 5.25; S'atapatha Bra_hman.a 4.1.1.9, 5.1.1.16; Taitttiri_ya Bra_hman.a 1.3.5.12).

ससर्परीर् अमतिम् बाधमाना बृहन् मिमाय जमदग्निदत्ता ।
आ सूर्यस्य दुहिता ततान श्रवो देवेष्व् अमृतम् अजुर्यम् ॥
ससर्परीर् अभरत् तूयम् एभ्यो ऽधि श्रवः पाञ्चजन्यासु कृष्टिषु ।
सा पक्ष्या नव्यम् आयुर् दधाना याम् मे पलस्तिजमदग्नयो ददुः ॥

3.053.15 The daughter of Su_rya given by Jamadagni gliding everywhere and dissipating ignorance, has emitted a mighty (sound), and has diffused ambrosial imperishable food among the gods. [Given by Jamadagni: jamadagni datta_ = given by the r.s;is maintaining a blazing jamat-jvalat, fire, agni; mighty sound: the sound of thunder or the like in the sky; food among the gods:as the prayers or exclamation which accompanies the burnt offering].

3.053.16 May she, gliding everywhere, quickly bring us food (suited) to the five races of men; may she, the daughter of the sun whom the grey-haired jamadagnis gave to me, (be) the bestower of new life. [Five races of men: pan~cajanya_su kr.s.t.is.u: five distinctions are restricted to human beings; hence, the reference may be to four castes and barbarians; daughter of the sun: paks.ya_, the daughter of Paks.a: paks.a nirva_hakasya, the distributor of the parts (of the year?), i.e. su_ryasya, of the sun; bestower of new life: navyam a_yur dadha_na, having new life or food: mama kurvan.a_ bhavatu].

This account is evidence that Vis'va_mitra acquired the knowledge of sasarpari va_c from Jamadagni. The principal attributes of this va_c are: that it su_ryasya duhita_, daughter of the sun, thus making it in visible form; that it is sasarpari_, i.e. serpentine or cursive in form and that it is paks.ya_, i.e. written with feather or quill. Sa_yan.a's commentary on sasarpari_ is: s'abdaru_pataya_ sarpan.as'i_la, sarvatra gadyapadyamakatvena sarpan.as'I_la va_gdevata_. S'aunaka called this sasarpati_ Bra_hmi.

परि॑ तृन्धि पणी॒नाम् आर॑या॒ हृद॑या कवे ।

अथे॑म् अ॒स्मभ्यं॑ रन्धय ॥

वि पू॑ष॒न्न् आर॑या तुद प॒णेर्॑ इ॑च्छ हृ॒दि प्रि॒यम् ।

अथे॑म् अ॒स्मभ्यं॑ रन्धय ॥

आ रि॑ख किकि॒रा कृ॑णु पणी॒नां हृद॑या कवे ।

अथे॑म् अ॒स्मभ्यं॑ रन्धय ॥

याम् पू॑षन् ब्रह्म॒चोद॑नी॒म् आरा॒म् बिभ॑र्ष्य् आघृणे ।

तया॑ समस्य॒ हृद॑य॒म् आ रि॑ख किकि॒रा कृ॑णु ॥

6.053.05 Pierce with a goad the hearts of the avaricious, wise Pu_s.an, and so render them complacent towards us. [Pierce with a goad: pari tr.ndhi a_ray_: a_ra_ is described as a stick with a slender point of metal; pratoda, a goad; the common vernacular derivative, a_ra_h, is a saw. Ara, Ara_: 1 n. brass BhP. x , 41 , 20 ; iron L. ; a sting Comm. on TS. ; an angle ; a corner ; m. cavity

Su1ryas. ; N. of a tree L. ; N. of a lake KaushUp. ; the planet Mars; the planet Saturn L. ; ({A}) f. a shoemaker's awl or knife ; a bore ; a probe RV. Sus'r.&c. ; an aquatic bird. Ara: n. v.l. for{ara} q.v. , a spoke MBh. i , 1498 (ed. Bomb. i , 33 , 4 reads {ara}) (Cologne Sanskrit Dictionary)].
6.053.06 Pierce with a goad, Pu_s.an, the heart of the avaricious; generate generosity in his heart, and so render him complacent towards us.
6.053.07 Abrade, wise Pu_s.an, the hearts of the avaricious; relax (their hardness), and so render them complacent towards us. [This shows the purpose of a_ra_, to abrade, to smoothen, as an abrasive].
6.053.08 Resplendent Pu_s.an, with that food-propelling goad which you bear, abrade the heart of every miser, and render it relaxed. [kikira_ = to tear into pieces , rend into rags and tatters RV. vi , 53, 7 and 8.]

This sequence of r.cas can also be interpreted as Pu_s.an being invoked to write (a message of amity) on the heart of the Pan.is with an ara_ or stylus and make their heart amicable to ya_jn~ika_s. The a_ra_ is feminine and referred to as brahmacodani_ or that which vivifies the mantras.

This is cited as another example of the prevalence of writing in R.gvedic times.

Sarasvati in the Atharvaveda

The following hymns and translation are from W.D.Whitney's Atharvaveda Sam.hita_. The hymns of the Atharvaveda refer to Sarasvati_ as a goddess and in association with the ancestors, Pitr.s. Sarasvant is associated with the waters and water courses. In all references, Sarasvati_ invariably gets associated with plants or prosperity.

deva imam madhuna_ samyuktam yavam sarasvatya_m adhi man.a_v acarkr.s.uh
Indra a_si_t si_rapatih s'atakratuh ki_na_s'a_ a_san marutah suda_navah

6.30.1 This barley, combined with honey, the gods ploughed much on the Sarasvati_, in behalf of Manu; Indra, of a hundred abilities, was furrow-master; the liberal (?suda_nu) Maruts were the ploughmen.

This hymn is a remarkable association of Sarasvati_ as the deity of agriculture, an apparent link with Sarasvati_ as a river. The river basin is described to be fertile, abounding in the yild of grains and for making oblations to the gods.

The banks yielded crop of barley after they were ploughed by the gods. Indra is si_rapatih, the lord of the plough and the Maruts are ki_na_s'ah, the farmers. Sarasvati_ is requested to provide water from her clouds tgo save kr.s.i from burning in the scorching heat of the sun and so as not to shatter it with the thunder of the clouds. (yaste pr.thu stanayitnurya kr.s.vo daivah keturvis'vama_bhu_s.ati_dam ma_ no vadhi_rvidyuta_ deva sasyam mota vadhi_ ras'mibhih su_ryasya: AV. 7.12.1 Thy (Sa_rasvatam) broad thundering, which, exalted, a sign of the gods, spreads over (a_bhu_s.) this all—do not, O god, smite our grain with the lightning, and do not smite (it) with the sun's rays.)

3.20.7 Do thou stir up Aryaman, Brihaspati, Indra, unto giving; (also) Va_ta (wind), Vis.n.u, Sarasvati_ and the vigorous (va_jin) Savitar.

[For recovery of virility: with a plant]
adya_gre adya savitaradya devi sarasvati
adya_sya Brahman.aspate dhanuriva_ ta_naya_ pasha

4.4.6 Now, Agni! Now, Savitar! Now, goddess Sarasvati_! Now, Brahman.aspati, make his member taut like a bow.

[Against niggardliness and its effects]
sarasvati_manumatim bhagam yanto hava_mahe
va_ce jus.t.a_m madhumati_mava_dis.am deva_na_m devahu_tis.u
yam ya_ca_myaham va_ca_ sarasvatya_ manoyuja_
s'raddha_ tamadya vindatu data_ somena babhrun.a_

5.7.4-5 Sarasvati_, Anumati, Bhaga, we going call on; pleasant (jus.t.a) honeyed speech have I spoken in the god-invocations of the gods.
Whomever I solicit (ya_c) with speech, with Sarasvati_, mind-yoked, him may faith find today, given by the brown soma.

[To various divinities: for protection]
pa_ta_ no dya_va_pr.thivi_ abhis.t.aye pa_tu gra_va_ pa_tu somo no amhasah
pa_tu no devi_ subhaga_ sarasvati_ pa_tvagnih s'iva_ ye asya pa_yavah

6.3.2 Let heaven-and-earth protect us in order to assistance (abhi_s.t.i); let

the pressing-stone protect, let Soma protect us from distress; let the fortunate goddess Sarasvati_ protect us; let Agni protect us00 the propitious protections that are his.

apa_na_ya vya_na_ya pra_n.a_ya bhu_ridha_yase
sarasvatya_ uruvyacem vidhema havis.a_ vayam

6.41.2 To expiration, to perspiration (vya_na_), to breath the much nourishing, to Sarasvati_ the wide extending, would we pay worship with oblation.

[To win affection]
mahyam tva_ mitra_varun.au mahyam devi_ sarasvati_
mahyam tva_ madhyam bhu_mya_ ubha_vantau samasyata_m

7.89.3 Unto me let Mitra-and-Varun.a, unto me divine Sarasvati_, unto me let the middle of the earth, let both (its) ends fling (sam-as) thee.

[For harmony]
sam vo mana_msi sam vrata_ sama_ku_ti_rnama_masi
ami_ ye vivrata_ sthana ta_n vah sam namaya_masi
aham gr.bhn.a_mi manasa_ mana_msi mama cittamanu cittebhireta
mama vas'es.u hr.daya_ni vah kr.n.omi mama ya_tamanuvartma_na eta
ote me dya_va_pr.thivi_ ota_ devi_ sarasvati_
oltau ma indras'ca_gnis'cardhya_smedam sarasvati

6.94.1-3 We bend together your minds, together your courses, together your designs; ye yonder who are of discordant courses, we make you bend (them) together here.
I seize (your) minds with (my) mind; come after my intent with (your) intents; I put your hearts in my control; come with (your) tracks following my motion.
Worked in for me (are) heaven-and-earth; worked in (is) divine Sarasvati_; worked in for me (are) both Indra and Agni; may we be successful here, O Sarasvati_.

[To Sarasvati_]
yaste stanah s'as'ayuryo mayobhu_ryah sumnayuh suhavo yah sudatrah
yen a vis'va_ pus.yasi va_rya_n.i sarasvati tamiha dha_tave kah
yaste pr.thu stana_yitnurya r.s.vo daivah keturvis'vama_b hu_s.ati_dam

ma_ no vadhi_rvidyuta_m deva sasyam mota vadhi_ ras'mibhih su_ryasya

7.11 The breast of thine that is unfailing (?), that is kindly, that is favourable, easy of invocation, that is very liberal, with which thou gainest (?pus.) all desirable things—O Sarasvati_, may thous cause (us) to suck that here.
[Against injury to the grain by lightning]
7.12 Thy broad thundering, which, exalted, a sign of the gods, spreads over (?a_-bhu_s.) this all—do not, O god, smite our grain with the lightning, and do not smite (it) with the sun's rays.

[In praise of Sarasvant?]
divyam suparn.am payasam br.hantamapa_m garbham vr.s.abhamos.adhi_na_m
abhi_pato vr.s.t.ya_ tarpayantama_ no gos.t.he rayis.t.ha_m stha_paya_ti

7.39.1 (Him), the heavenly eagle, milky, great, embryo of the waters, bull of the herbs, gratifying with rain from close by (?), in our cow-stall standing in wealth may (one) establish.

ayance da_s'us.e da_s'vamsam sarasvantam pus.t.apatim ra_yis.t.ha_m
ra_yaspos.am s'ravasyum vasa_na_ iha huvema sadanam rayi_n.a_m

7.40.1-2 [He] whose (established] course all the cattle go, in whose course stand the waters, in whose course the lord of prosperity is entered—him, Sarasvant, we call to aid.
We, putting on abundance of wealth (and) ambition (?), would (here) call hither to (us) Sarasvant, a bestower coming to meet his bestower (da_s'va_ns), lord of prosperity, standing in wealth, seat of wealths.

yada_s'asa_ vadato me vicuks.ubhe yad ya_cama_nasya carato jana_m anu
yad a_tmani tanvo me viris.t.am sarasvati_ tada_ pr.n.ad ghr.tena
sapta ks.aranti s'is'ave marutvate pitre putra_so apyavi_vr.tannr.ta_ni
ubhe idasyobhe asya ra_jata ubhe yatete ubhe asya pus.yatah

7.59.1-2 What has gone wrong (vi-ks.ubh) on the part of me speaking with expectation, what of (me) going about among people begging, what in myself of my body is torn apart—that may Sarasvati_ fill up with ghee.

Seven flow for the Marut-accompanied young one (s'is'u); for the father the sons have made to understand righteous things; both indeed bear rule over this of both kinds; both strive, both prosper (pus.) of it.

sarasvati vrates.u te divyes.u devi dha_masu
jus.asva havyama_hutam praja_m devi rara_sva nah
idam te havyam ghr.tavat sarasvati_dam pitr._n.a_m havira_syam yat
ima_ni ta udita_ s'atama_ni tebhirvayam madhumantah sya_ma

7.70-71, 1-3 O Sarasvati_, in thy courses, in thy heavenly domains, O goddess, enjoy thou the offered oblation; grant us progeny, O goddess.
This (is) thine oblation, rich in ghee, O Sarasvati_; this the oblation of the Fathers that is to be consumed (?); these thy most wealful utterances; by them may we be rich in sweet.
Be thou propitious, most wealful to us, very gracious, O Sarasvati_; let us not be separated from sight of thee.

Sarasvati_ in the Ra_ma_yan.a

Ayodhya_ka_n.d.a relates the journey of Bharata from Ra_jagr.ha to Ayodhya_:

Proceeding from Ra_jagr.ha in an easterly direction and then surveying and crossing the well-known river Suda_ma_ as well as the broad river Hra_dini_, the powerful and dignified Bharata, a glorious scion of Iks.wa_ku, crossed the river S'atadru (the modern Sutlej), whose stream takes a westward course. (1-2) Crossing another stream at Ailadha_na (a village of that name) and reaching the territory of Aparaparvata and crossing a river which petrified everything thrown into it, he reached the tract lying to the south-east and known by the name of S'alyakars.an.a (so-called because it abounded in a herb possessing the virtue of extracting a thorn etc.)(3) Gazing on the river S'ila_va_ha_ (so-called because it carried away even rocks along its swift stream, a possible reference to Dr.s.advati_) and getting purified (through bathing in it), Bharata (who was true to his promise) crossed the Maha_s'aila hills heading towards the forest of Caitraratha. (4) Reaching the river Sarasvati_ (flowing towards the west) and (a branch of) the (holy) Ganga_ at their confluence, he passed through the northern part of the Vi_ramatsya territory and entered the forest of Bha_run.d.a. (5) Having duly crossed the swift and thundering river named Kulin:ga_ (perhaps Kalinda river), hemmed in by mountains, and reaching the

Yhamuna_, he allowed the detachment (accompanying him) and giving the fatigued animals (food and) rest (in the shade of trees), nay, (himself) bathing and quenching his thirst, and taking water (for the journey ahead). Bharata proceeded further. (7) The prince, who had undergone propitious rites (before embarking on the long journey), crossed (speedily) by his excellent chariot the great forest (lying in the way), which was not frequented, (even) as the wind sweeps through the atmosphere. (8) Finding the great river Gan:ga_ (associated with the name of Emperor Bhagi_ratha, who was instrumental in bringing the stream to the terrestrial region) difficult to cross at (the village of) Am.s'udha_na_, Bharata, (a scion of Raghu) hastily approached it (with a view to crossing it) at the well-known town of Pra_gvat.a (where it could be easily crossed). (9) (Va_lmi_ki R. Ayo. K. 51.1-9).

The place name ailadha_na evokes the memories of Aila. "According to tradition…the Ailas or Aryans began at Allahabad, conquered and spread out north-west, west and south, and had by Yaya_ti's time occupied precisely the region famed as Madhyades'a. They possessed that Mid-land definitely and made it their own thoroughly, so that it was 'their true pure home', as Sir G. Grierson describes it linguistically. (*Imp. Gaz. of India,* 1907, I, p. 357). They expanded afterwards into the Panjab and East Afghanistan, into West Indi and the north-west Dekhan, into East and South Bihar and into Bengal—precisely as he finds the Aryans did linguistically in those very regions, which he calls the 'Outer Band' (ibid., p. 358)…

"Current opinion, in order to explain those facts, postulates not only an invasion of Aryans from the north-west, but even a double invasion, and the theory is that 'the inhabitants of the Midland represent the latest stage of Indo-Aryan immigration',. and that the latest invaders entered 'into the heart of the country already occupied by the first immigrants, forcing the latter outwards in three directions, to the east, to the south and to the west' (ibid., p. 358). This theory is improbable in itself, and certainly implies a severe and bitter struggle between the second and the first immigrants, of which one would expect to find some echo in tradition, for it concerned the very heart of India, yet there is absolutely none. It is wholly unnecessary according to tradition…the bulk of the Rigveda was composed in the great development of Brahmanism that arose under the successors of king Bharata who reigned in the upper Ganges-Jumna doab and plain.

“The language of the Rigveda, as Sir G. Grierson holds, represents the archaic dialect of the upper doab, and that was the region in which the Aryan speech was the purest and whence it spread outwards. (ibid., p. 357). The two agree. Lastely, there was some connexion between Sudyumna and the Uttara Kurus and Kimpurus.as, and that accords with the connexion which Sir G. Grierson notices between the Mun.d.a_ language and the ‘pronominalized Himalayan languages’. (ibid., pp. 386-7, *JRAS*, 1907, p. 188). In every respect therefore the evidence of language accords with the Puranic accounts, and is strong testimony to the value of tradition…what does tradition say about the origin of the Ailas or Aryans? It makes the Aila power begin at Allahabad, and yet distinctly suggests that they came from outside India.

“The legends and fables about the progenitor Puru_ravas Aila all connect him with the middle Himalayan region. He was closely associated with the Gandharvas. His wife Urvas’i_ was a Gandharvi_, as well as called an apsaras. The places he frequented were the river Manda_kini_, Alaka_, the Caitraratha and Nandana forests, the mountains Gandhama_dana and Meru, and the land of the Uttara Kurus—regions to which the Gandharvas were assigned. From the Gandharvas he obtained sacrificial fire; his sons were known in the Gandharva world; and he ultimately became united with the Gandharvas. Further the fables about his birth point to that region, and two accounts connect his alleged parent Ila with the northern Ila_vr.ta, which they say was named after him (Pad. P. v,8,119)…the countries in and beyond the middle of the Himalayas, has always been the sacred land of the Indians. Indian tradition knows nothing of any Aila or Aryan invasion of India from Afghanistan, nor of any gradual advance from thence eastwards. On the other hand it distinctly asserts that there was an Aila outflow of the Druhyus through the north-west into the countries beyond, where they founded various kingdoms and so introduced their own Indian religion among those nations…All ancient Indian belief and veneration were directed to the mid-Himalayan region, the only original sacred outside land (MBh v,110; vi,12); and it was thither that rishis and kings turned their steps in devotion, never to the north-west. The list of rivers in Rigveda 10.75 is in regular order from the east to the north-west—not the order of entrance from the north-west, but the reverse…

“The Sindhu no doubt attracted attention because of its immense size and the Sarasvati_ because of its sanctity, which was largely due to its being in the territory of the Bha_rata kings of Hastina_pura, among whom (and not in the Panjab) the development of Rigvedic brahminism took place…The Rigveda

knows of the Sarayu, and there is no good reason for doubting that that is the river of Oudh…Further light is thrown on this matter by a treaty between a Hittite king and a king of Mitanni found at Boghazkoi. It mentions, as noticed by Professor Jacobi (*JRAS*, 1909, p. 723), certain gods who can be none other than Mitra, Varun.a, Indra and the Na_satyas (As'vins). These are Indian Aryan gods, and he has shown that they could not belong to the period priod (according to the current theory) to the separation of the Indian and Iranian branches. The date of the treaty has been fixed reliably now about 1400 BC, and therefore the folk of Mitanni who worshipped these gods had arrived there earlier, probably late in the sixteenth century. These facts prove (1) that there was an outflow of people from India before the fifteenth century BC; (2) that they brought Aryan gods from India; (3) that therefore Aryans and their gods existed in India earlier still. These facts and conclusions are hardly reconcilable with the current theory about the entrance of the Aryans into NW India and the composition of the hymns of the Rigveda. (cf. Prof. Keith, *JRAS*, 1914, p. 737). (F.E. Pargiter, 1922, *Ancient Indian Historical Tradition*, London, pp. 296-300; repr. Delhi, Motilal Banarsidass, 1962).

The archaeological evidence belies any large-scale migrations of people into Bha_rat:

> "The discovery of unburied skeletons among the latest levels of Harappan occupation of Mohenjo-daro combined with uncritical and inaccurate readings of the Vedic texts led some scholars to claim that the decline of the Indus civilization was the result of `invasions' or `migrations' of the Indo-Aryan speaking Vedic/Aryan tribes... Many scholars have tried to correct this absurd theory, by pointing out misinterpreted basic facts, inappropriate modes and an uncritical reading of Vedic texts.[T]here is no archaeological or biological evidence for invasions or mass migrations into the Indus Valley between the end of the Harappan phase, about 1900 BC, and the beginning of the Early Historic period around 600 BC." (J.M. Kenoyer, 1998,. *Ancient Cities of the Indus Valley Civilization*, OUP, p. 174).

From the archaeological record, a totally indigenous framework is apparent for the cultural development of the Sarasvati Sindhu River Basins. The archaeological record also establishes close contacts with the Mesopotamian civilization area ca. 3000-2000 BC. Pre-urban settlements in the plains of the Sindhu in Sind province, the Sindhu and her tributaries in Punjab and the

Sarasvati in the Marusthali_/Cholistan desert provide the context of the Indian Civilization, a process which began in the first half of the fourth millennium BC.

> "...there is some ground to infer that the discovery of extraordinarily rich copper objects belonging to the Ganeshwar culture in a copper-rich area of the Aravallis in northeast Rajasthan underlines in some way this increased use of raw materials. This culture certainly belongs to the first half of the third millennium BC. Among other things, the Ganeshwar-type of artifacts have been found in the early Harappan assemblage at Kalibangan and at the mesolithic level at Bagor in southeast Rajasthan. The point is that this small site in Rajasthan yielded more than a thousand copper artifacts and there are forty-six Ganeshwar-type sites in the list prepared by J.P. Joshi, Madhu Bala and J. Ram (1994). The presence of reserved-slip ware at these sites strongly suggests a Harappan link, and I infer that, beginning with the early Harappan level, this area of Rajasthan was a highly flourishing centre for copper metallurgy and that its relationship with the early Harappan level at Kalibangan and probably beyond, as far as Cholistan, supports my assumption of craft-specialization as a distinct variable leading to the emergence of the Indus Civilization."(Dilip K. Chakrabarti, 1995, *The archaeology of Ancient Indian Cities*, Delhi, OUP, pp. 51-52).

Maha_bha_rata Vanaparva (5.3): tatah sarassvati_ku_le sames.u marudhanvasu ka_myakam na_ma dadr.s'urvanam munijanapriyam: on the banks of the Sarasvati_, in the Maru plains, they (pa_n.d.avas) saw the ka_myaka forest which is frequented by the sages. Maha_bha_rata (Vana Parva, Chapter 84, Verse 66) notes that if one bathes in the holy river Sarasvati_ and worships one's ancestors, one will attain Sa_rasvataloka. Following the death of S'ri_ Kr.s.n.a, his 16008 wives attained svarga by drowing in Sarasvati_. (Svarga_rohan.a Parva, Chapter 5, Verse 25).

Va_mana Pura_n.a described Sarasvati_ as pan~caru_pa_ (13.20), i.e. with five tributaries. This is consistent with Yajus.: pan~ca nadyuh saravati_mapi yanti

sasrotasah sarasvati_ tu pan~cadha_ so des'obhavsarit (YS 34.11: Five rivers flowing on their speed onward to Sarasvati_, but then became Sarasvati_ a fivefold river in the land).

Na_radapura_n.a (Kuruks.etra maha_tmyam, Part 1. 64): sarasvati_ nadi_ pun.ya_ tatha_ vaitaran.i_ nadi_ gan:ga_ manda_kini_ pun.ya_ tathaiva_nya_ madhusrava_
vaitarn.i_, dr.s.advati_ kaus'iki_ ca pun.ya_ haran.yavati_ nadi_ vars.a_ka_lavaha_s'caita_ varjayitva_ sarasvati_m:

Vaitaran.i, dr.s.advati_, kaus'iki_ and hiran.yavati_ rivers are also sacred; excluding Sarasvati_, these rivers flow only during monsoon. (these may be four of the five tributaries of Sarasvati_ river).

Va_mana Pura_n.a (P. 34/6 –8) adds the rivers A_paga- and Amlu to this list of rivers related with Sarasvati_ river in the Na_rada Pura_n.a.

sarasvati_ dr.s.advatyor devanadyoryadantaram
tam devanirmitam des'am brahma_varttam pracaks.ate
(Manusmr.ti: 2.17)

This is echoed in the Great Epic:

daks.in.ena sarasvatya_ uttaren.a dr.s.advati_m
ye vasanti kuruks.etre te vasanti trivis.t.ape (MBh. Vana. 81.175)

Kuruks.etra was founded by Kuru, the son of Sam.varan.a, on the banks of the river Dr.s.advati_. (Va_yu P. Pu_rva_. 1.12; Brahma P. 11.106; Va_mana P. 22.59, 41.12.21; Padma P. Uttara 217.8). Kuruks.etra was formerly known as Samantapan~caka or Ramahrada (Va_mana P. 22.15, 30,61; Na_rada P. II.64.12); it became a sacred land because King Kuru did tapas there. (MBh. A_di Parva, Ch. 14, Verse 50). Ramahrada is also known as Brahmasaras, because Brahma_ performed penances on the shore of this lake. (Na_rada P. II.64.12; Harivam.s'a II.109.36). Diti is said to have performed penances on the bank of the River Sarasvati_ at Samantapan~caka. (Matsya P. 7.1-3). Balara_ma is said to have built five lakes at Samantapan~caka to propitiate his sins. (Bha_gavata P. IX. 16.19; X.82.2-3). The land is also called Sannihiti_ (or Rudrahrada), since all the ti_rthas gather together here every month on Ama_va_sya day. (Brahma_n.d.a P. Madhya. Upo. 13.68; Agni P. 109.5;

Va_mana P. 41.9; Padma P. Uttara 27.82; Sk. P. Ka_s'I 35.38). Those who bathe in the Sannihiti_ti_rtha at the time of solar eclipse will obtain the fruits of conducting six horse-sacrifices; offerings to the manes at this place are of greatg importance. (MBh. Vana Parva, Ch. 83, Verse 190). It is notable that even today, during a solar eclipse day, a million pilgrims come to Kuruks.etra to take a dip in the Brahmasarovar lake. Hundreds of ti_rthas are located around the region of Kuruks.etra. Vya_sasthali_ or Vya_sati_rtha is located 17 miles southwest of Thaneshwar and called Basthali; this is said to be the place where Vya_sa died grieving for his son S'uka. (MBh. Vana. 83.96-98; Na_rada P. II.65.31). Saptasa_rasvata ti_rtha is a pilgrimage site visited by Balara_ma during his Sarasvati_ River pilgrimage (MBh. S'alya Parva, Ch. 37.61). This is a place of confluence of seven rivers: Suven.u, Mahodara_, Oghavati_, Vis'a_la_, Suprabha_, Ka_n~cana_ks.i_ and Vimalodaka_. (Va_mana P. 37.17-18, 62.45,54). Once Brahma_ performed a yajn~a on the island of Pus.kara. While all gods and goddesses attended, only Sarasvati_ among the rivers did not attend. Then, Brahma_ remembered Sarasvati_ and she appeared before the tapasvi_ hermits, under the name of Suprabha_. (MBh. S'alya, Ch. 38). Taijasa is a ti_rtha of Varun.a; this was the place where Skanda or Subrahman.ya was coronated as the commander of the armed forces of the devas. (MBh. Vana. 83.164).

For many years, this land was ploughed by Kuru himself so that all those who died there could be received into heaven. Kuru and Indra agreed that Indra should admit into heaven those who died on this land either while performing a penance or while fighting on this battlefield. (Va_mana P. Chs. 21-22; Va_yu Utt. 37.209-211; Matsya P. 50.20-22). One of the five Brahmavedis, namely the Uttaravedi of Pita_maha is also called Kuruks.ketra. (Va_mana P. 22.61, 35.1; Na_rada P. II.64.23; Padma P. Svarga 27.96). Kuruks.etra which was called Brahma_varta (MBh. Vana 83.53; Harivam.s'a I.32.85) was the land between the rivers Sarasvati_ and Dr.s.advati_ and close to the river Apaya_. (Aitareya Br. VII.30; S'atapatha Br. IV.1.5.13, XI.5.1.14, XIV.1.1.2; Maitra_yan.i_ Sam. II.1.4, IV.5.9; Jaimini_ya Br. III.126; S'a_nkha_yana S'r. Su_tra XV.16.11). From this region, the Kurus occupied the area known as Brahmars.ides'a with the capital city Karavi_rapura on the confluence of Rivers Dr.s.advati_ and Barhis.mati_. [(MBh. Anus'a_sana Parva, Ch. 25) Karavi_ra was a region located at the base of the mountain Gomanta (near Dwa_raka; also in the island of Kus'a; also a place of habitation lying to the north-east of ancient India: MBh. Bhi_s.ma Parva, Ch. 9, Verse 43; Ch. 12, Verse 8) and was ruled by a King called Sr.ga_lava_sudeva. The king was

killed by S'ri_ Kr.s.n.a and Balara_ma jointly as per the instructions of Paras'ura_ma. (Bha_gavata, 10th Skandha). It is also notable that Karavi_ra is mentioned as a forest in the neighbourhood of Dwa_raka. (MBh. Sabha_ Parva, Ch. 38)]. Taittiri_ya A_ran.yaka notes that Kha_n.d.ava, Turghna and Parin.aha formed the borders of Kuruks.etra (cf. Kane, *History of Dharma S'a_stra*, IV, p. 631). The location of khand.ava forest is on the bank of the river Yamuna_. (Padma P. Uttara 199.1.17, 206.44, 213.77; MBh. :A_di Chs. 223-225). Taks.aka left the place before the khand.ava forest burned down and went to Kuruks.etra. (MBh. A_di Parva, Ch. 226, Verse 4). Pura_n.as refer to seven forests around Kuruks.etra: Ka_myakavana, Aditivana, Vya_savanna, Phalki_vana, Su_ryavana, Madhuvana and Pun.yas'i_rn.avana or Si_ta_vana. (Va_mana P. 34.3-5). Turghna is identified with Sugh village which is surrounded on the three sides by the old bed of Yamuna_. (Cunningham, *Cunningham's Ancient Geograpohy of India*, p. 345).

Manu Sam.hita_ (II 17/19) notes that the land between Sarasvati_ and Dr.s.advati_ is called Brahma_varta and the countries of Kuruks.etra, Matsya, Pa_n~ca_la and S'u_rasena constitute Brahmars.ides'a that lies after Brahma_varta. Bhavis.ya Pura_n.a (7/60-62) also states that the country between Sarasvati_ and Dr.s.advati_ is called Brahma_varta while the territories of Kuruks.etra, Matsya, Pa_n~ca_la and S'u_rasena are the Brahmars.ides'a. Other monsoon-fed rivers are also mentioned as located in Kuruks.etra: Vaitaran.i_, A_paga_, Gan:ga_, Manda_kini_, Madhusrava_, Amlu, Kaus'iki_, Hiran.vati_. (Na_rada P. II.65.7).

Vedic S'utudri_ (S'atadru) is mentioned by Ya_ska (Nirukta IX. 26); the lake Brahmasara is said to have been situated in its stream. Its source is traced to the west of the lake Ma_nasa (also called Brahmasara). Ptolemy calls it Zaradros and Pliny calls it Hesydens. (McCrindle, *Ancient India as described by Ptolemy*, p. 10, 91). Arrian reports that it had flowed independently into the Gulf of Kutch. (*Imperial Gazetteer of India*, XXIII, p. 179).

Matsya Pura_n.a (121/64-65) traces the source of Sarasvati_ to the lake called Sarpasarova on the Hemaku_t.a mountain. Va_mana Pura_n.a (2/43, 13/20) places the source from the twin mountain peaks called Nara and Na_ra_yan.a. Va_mana Pura_n.a (42/5-6) adds that entreated by sage Ma_rkan.d.eya Sarasvati_ flowed through Kuruks.etra and then flowed westward. This is also mentioned in Padma Pura_n.a. (Sr.s.t.i 18/248). Maha_bha_rata sources the Sarasvati_ from Brahmasara (Ma_nasa lake). (S'alya 42/29).

Va_lmi_ki Ra_ma_yan.a (Ayodhya_ka_n.d.a: LXXI 1-9) describes the return journey of Bha_rat from Girivraja in Kekaya to Ayodhya_ crossing many streams and rivers and passing through different territories:

“Proceeding from Ra_jagr.ha in an easterly direction...river Suda_ma_...broad river Hra_dini_, the powerful and dignified Bharata, a glorious scion of Ikswa_ku, crossed the river S’atadru (Sutlej), whose stream takes a westward course. Crossing another stream at Ailadha_na and reaching the territory of Aparaparvata and crossing a river which petrified everything thrown into it, he reached the tract lying to the south-east and known by the name of S’alyakars.an.a. Gazing on the river S’ila_vaha_ (so-called because it carried away even rocks along its swift stream—may be a reference to Ghaggar or Dr.s.advati_) and getting purified (through bathing in it), Bharata crossed the Maha_s’ila hills heading towards the forest of Caitraratha. Reaching the river Sarasvati_ (flowing towards the west) and (a branch of) the (holy) Gan:ga_ at their confluence, he passed through the northern part of the Vi_ramatsya country and entered the forest of Bha_run.d.a. Having duly crossed the swift and thundering river named Kulin:ga_, hemmed in by mountains, and reaching the Yamuna_, he allowed the detachment to rest for the time being...Finding the great river Gan:ga_ difficult to cross at Am.s’udha_na, Bharata hastily approached it at the well-known town of Pra_gvat.a...”

This account provides a clear sequence of the rivers: S’atadru, Dr.s.advati_, Sarasvati_, Yamuna_ and Gan:ga_. The reference to the confluence of Sarasvati_ with a stream of the river Gan:ga_ is notable.

Va_lmi_ki Ra_ma_yan.a cites: (Kis.kinda_ka_n.d.a 40/20-21):

> **nadi_m bha_gi_rathi_m ramya_m sarayu_m kaus’iki_ tatha_ ka_lindi_m yamuna_m ramya_m ya_munam ca maha_girim sarasvati_m ca sindhum ca s’on.am maninibhodakam**

(Rama and Sugri_va converse): “...reaching the river Bha_gi_rathi_ (the holy Gan:ga_), the delightful Sarayu_ and Kaus’iki_ (the modern Kos’i_), the lovely Yamuna_, having its source in the Kalinda mountain, as well as the huge mountain Kalinda (the source of Yamuna) as also the Sarasvati_ and Sindhu (the modern Indus) and the Sona, whose waters sparkle as a gem...”

Pehoa inscription of Imperial Pratiha_ra Dynasty (Epigraphic Indica, Vol. I, p. 187, 11.14-15) refers to Pr.thu_daka in the vicinity of the pra_ci_ sarasvati_. Va_mana Pura_n.a also cfites the river as Pra_ci_ Sarasvati_ (Sm. 21.19):

sna_tva_ s'uddhim ava_pnoti yatra pra_ci_ sarasvati_
devama_rgapratis.t.ha_ ya_ devama_rgen.a nihsr.ta_

Bha_gavata Pura_n.a (4.19.1; Gita Press edn.) cites the Pra_ci_ Sarasvati_ in Brahma_varta:
atha_di_ks.ata ra_ja_ tu hayamedhas'atena sah
brahma_varte manoh ks.etre yatra pra_ci_ sarasvati_

At Pus.kara also, it is referred to as Pra_ci_ Sarasvati_:

pus.kara_ran.yama_sa_dya pra_ci_ yatra sarasvati_
matih smr.tih s'ubha_ prajn~a_ medha_buddhirdaya_ para_
sarasvatya_stu parya_ya_s.s.ad.ete sampraki_rtita_h
tatah prabhr.ti yatra_sau pra_ci_bhu_ta_ sarasvati_ (Padma Pura_n.a Sr.s.t.i. 18.220-221).

After the desiccation of the western Sarasvati_ river, i.e. the river coursing through Ghaggar-Hakra-Nara-Nal-Prabha_sa, Sarasvati_ is persuaded by Na_ra_yan.a to stay on:

pun.yaks.etre hya_jaga_ma bha_rate sa_ sarasvati_
gan:gas'a_pena kalaya_ svayam tasthau hareh padam (Brahmavaivarta Pura_n.a ii.7.1)

The legend which perhaps relates to the drying up of Sarasvati_ river is as follows: Sarasvati_ and Gan:ga_ enter into a quarrel. Sarasvati_ pledges to end her existence. Ultimately, as decreed by Na_ra_yan.a, Sarasvati_ is persuaded to stay on and only a small part of her descends into the holy land of Bha_rata as Pra_ci_ Sarasvati_. This legend is the most emphatic statement in an ancient text which explains the use of the term pra_ci_ sarasvati_ (or eastern Sarasvati_, in contrast with a western Sarasvati_ which had been desiccated).

Padma Pura_n.a (Svarga 3/65-66) notes seven streams: vatodaka_, nalini_, sarasvati_, jambu_nadi_, si_ta_, gan:ga_ and sindhu. According to Matsya Pura_n.a (P. 114/20-22), the rivers Gan:ga_, Sindhu, Sarasvati_, S'atadru,

Chandrabha_ga_, Yamuna_, Sarayu_, Aira_vati_, Vitasta_, Vis’a_la_, Devika_, Kuhu, Gomati_, Dhautapa_pa_, Ba_huda_, Dr.s.advati_, Kaus’iki_, Tr.ti_ya_, Nis’cala_, Gan.d.aki_, Iks.u and Lauhita rise among the Himalayan mountains. Alberuni (Sachau, E.G., *Alberuni’s India*, I. Ch. 25) calls the river Satarudra or Sataldar Sarsat flowing to the country of Sarsat (i.e., Sa_rasvata).



S’ri_madbha_gavata Maha_pura_n.am 10.71.21:

Anartasauvi_ramaru_msti_rtva_ vinas’anam harih giri_n nadi_rati_ya_ya puragra_mavraja_kara_n (When Hari—S’ri Kris.n.a—was called to participate in the ra_jasu_ya yajn~a of yudhis.t.hira, on his way from Dwaraka, he crossed the following: anarta, sauvi_ra, maru (ma_rwa_r.); and then, vinas’ana, mountains, rivers, cities, villages and clans. This sequence seems to indicate that Vinas’ana was recognized in the days of the Bha_gavata legend to be located after the maru region, i.e. perhaps, at the eastern end of the Great Indian desert, the Thar.

She, Sarasvati_

Barhut, 2nd century BC; Indian Museum, Calcutta.

On a Barhut railing, Sarasvati_ is shown standing on a lotus and playing a vi_n.a_ of seven strings. (J.N.Banerjea, *Development of Hindu Iconography*, p. 377, pl. XVII, Fig. 2).

Sarasvati_ as goddess conveys and inspires the Vedic learning; as an inspirer of eloquence, va_k, arts and crafts she has become the goddess of jn~a_na, learning.

Ams’ubheda_gama describes the iconographic features of Sarasvati_:

s_ caturhasta_ s’vetapadma_sana_nvita_

jat.a_mukut.asamyukta_ s'uklavarn.a_ sitambara_
yajn~opavi_ta samyukta_ ratnakun.d.alaman.d.ita_
vya_khya_nam ca_ks.asu_tram ca daks.in.e karadvaye
pustakam pun.d.ari_kam ca (pustakan kun.d.iva_ ca_pita) trinetra_
ca_ruru_pin.i_

She the goddess of white complexion, wears white garments and sits on white lotus. She wears yajn~opavita, ratna kun.d.ala and a jat.a_ mukut.a. She has four hands showing the vya_khya_na pose and holds a rosary (aks.asu_tra), a book and a lotus. She has three eyes. (loc. cit., T.A.G. Rao, *Elements of Hindu Iconography*, Vol. I, Pt. II, pp. 136-137).

Vis.n.udharmottara Pura_n.a and the Hema_dri describe that the goddess Sarasvati_ is bedecked with all ornaments and stands in the sampada pose on a lotus. She shows in her four hands a book, a rosary, a vi_n.a_ and a waterpot

> **Devi_ sarasvati_ ka_rya_ sarva_bharan.abhu_s.ita_**
> **Caturbhuja_ sa_ kartavya_ tathaiva ca samutthita_**
> **Pustakam ca_ks.ama_lam ca tasya_ daks.in.ahastayoh**
> **Va_mayos'ca tatha_ ka_rya_ vain.avi_ ca Kaman.d.alu**
> **Samapa_s'a pratis.t.a_ ca ka_rya_ somamukhi_ tatha_**
> **Veda_stasya_ bhuja_ jn~eya_h sarvas'a_stra_n.i pustakam**
> (Vis.n.udharmottara Pura_n.a, 64, 1-3).

S'uddhavidya_ is described in the S'ritattvanidhi with two hands holding rosary and a book and the other hands show chinmudra_ and abhaya. (S.T.85). In a Rajasthan image from Pallu, Bikaner, showing Goddess Vidya_ as the consort of Brahma_, she holds a rosary, a kaman.d.alu, a book and a lotus. Her mount, swan, is shown on a pedestal. S'a_nti Parva, Chapter 318, Verse 14 of the Maha_bha_rata narrates tha t Ya_jn~avalkya did penance and Sarasvati_ appeared before him wearing ornaments made of vowels and consonants and sounding 'OM'.

Ru_paman.d.ana describes her as having one face and four hands. She wears a mukut.a and kun.d.alas as well as a crescent on her head. She has a prabha_man.d.ala also. A distinction is made between Maha_vidya_ who holds in her four hands a rosary, a lotus, a vi_n.a_ and a book; and Sarasvati_ who shows a vara pose in one of her hands instead of holding the vi_n.a_.

Ekavaktra_ caturhasta_ mukut.ena vira_jita_
Prabha_man.d.alasamyukta_ kun.d.ala_nvitas'ekhara_
Aks.a_bjavi_n.a_ pustakam maha_vidya_ praki_rtita_
Vara_ks.abjam pustakn~ca sarasvvati_ s'ubha_vaha_

(Ru_paman.d.ana, V, 61-62; cf. pp. 88-89).

An image of Sarasvati_ as a consort of S'iva is seen in Brahmes'evasa temple, S'ri_sailam. The goddess is shown with six hands holding a noose, a battle axe, a goad and showing the varada pose. The emblem of the remaining one hand is not distinct. (F. Gravely, *Illustrations of Indian Sculpture: Madras Govt. Museum*, pl. XXI, *Iconography of Minor Hindu and Buddhist Deities*, p. 153).

The great Ka_s.mi_ri poet, Bilhan.a refers to Sarasvati_, S'a_rada_, Bha_rati_ and Va_gdevi_ in *Vikrama_n:kadevacarita*. Sarasvati_ is for him the goddess of poetry and eloquence. S'a_rada_'s abode is Pravarapura situated on the bank of the Madhumati_ river on Mt. Kaila_sa (Mahwi or Kishengan:ga_): dhatte yasya_h sphat.ikas'ucibhih ka_ntibhih ks.a_layantya_h sthitya_ gauri_gurur api gigir mi_nam uccaih s'ira_m.si gan:ga_ spardhoddhuramadhumati_ saikatottam saham.si_ vidya_raks.a_dhikr.tam akarot sa_ svayam s'a_rada_ yat (In the next verse, he states: Pravarapura, the original abode of S'a_rada_ (Sarasvati_) has exhibited various wonders. Women have attained command over speech both in Sanskrit and Pra_kr.ta as if they were their mother-tongues. (XVIII.5,6).

S'ri_tattvanidhi identifies Sarasvati_ with Sa_maveda (S.T. 102) and presents forms of Va_gi_s'vari_, Dhenuva_gi_s'vari_ and Saubha_gya Va_gi_s'vari_.

A legend relates that because of the idle nature of and consequent delays caused by Sarasvati_, Brahma_ had problems performing sacrificial rites. On one occasion, Brahma_ became angry with Sarasvati_ who did not come to help him with the rites and with the permission of the gods, married Ga_yatri_, the daughter of a sage and completed the ritual. (Veronica Ions, *Indian Mythology*, pp. 89-90). This is also related in the sthalapura_n.a of the Brahma temple in Pus.kar, Ajmer District, Rajasthan.

Kalhan.a, in Ra_jataran:gin.i_ refers to Sarasvati_ and S'a_rada_. He states that on the Mount of Bhed.a in Kashmir, Sarasvati_ still resides in the form of a swan on a pond: devi_ bhed.agireh s'r.n:ge gan:godbhedas'ucau svayam

sarontardr.s'yate yatra ham.saru_pa_ sarasvati_ (1.35). He notes that the mere sight of S'a_rada_ inspires speech used by poets: a_lokya s'a_rada_m devi_m yatra sampra_pyate ks.an.a_t taran:gin.i_ madhumati_ va_n.i_ ca kavisevita_ (1.37).

Sa_rasvata is the name of a group of inhabitants and of a region on the banks of the river Sarasvati_. (Br.had Devata_ II.16.62; Matsya Pura_n.a CXIV.50). Sa_rasvata is also mentioned as the son of Jaigi_s.avya (Va_yu Pura_n.a XXIII.138: jaigi_s.avye ti vikhya_tah sarves.a_m yogina_m varah). He is called the Vedavya_sa of the ninth dva_para (Vis.n.u Pura_n.a III.3.13: sa_rasvatyas'ca navame). The twelfth kalpa is named after Sa_rasvata. (Matsya Pura_n.a CCXC.5).

Sa_rasvata Des'a. Skanda Pura_n.a refers to the regions on the banks of Sarasvati river: kecit ti_res.u sa_rasvate tat.e [Skanda 1.iii.2.7(i), SV Press], that is, the region lying along the banks of the river Sarasvati_. This is also referred to as Sa_rasvata man.d.ala in Ca_lukyan inscriptions; "Sa_rasvata man.d.ala was formed by the modern Mehsana pra_nt, Radhanpura and Palanpur states minus Dehgam Taluka". (A.K.Majumdar, *Chalukyas of Gujarat*, p. 209, No. 11; cf. *Indian Antiquary*, VI, p. 191). According to Matsya Pura_n.a and other ancient texts, Sa_rasvatas were stated to be from the region of Sa_rasvata man.d.ala and also Bharukaccha (Broach), Ma_heya (Mahi_ valley), Kutch, Saura_s.t.ra, A_narta, and Arbuda. Matsya Pura_n.a, Jivananda Edition, CXIII.50-51; Ma_rkan.d.eya Pura_n.a, LVII, 45-52; Va_mana Pura_n.a XIII, 52-53; Br.hat Sam.hita_ XIV,2; XVI, 22).

Skanda Pura_n.a traces the upper reaches of the river Sarasvati_ in Kaila_sa-Ma_nasa des'a which included the sacred spots of Ma_nasa, Kaila_sa and Keda_ra (Skanda I.ii.10.4; I.ii.6.30). S'rikan.t.hades'a is also associated with Sarasvati_ river and blessed with the abundance of herbs and vegetation (Skanda V.i.35.31-32); the name is derived from S'rikan.t.ha, a na_ga, the presiding deity of this region: labdha vyapades'asya des'asya na_gatah s'ri_kan.ha na_ma_ nagoham (Ba_n.a's *Hars.a Carita*, ch.3, p. 112). The capital of S'rikan.t.hades'a was Stha_nes'vara (Thanesar, near Kuruks.etra) once ruled by Hars.a dynasty. The names of rulers were Pus.pabhu_ti, Prabha_karavardhana and Hars.a. The river had reportedly flowed from S'rikan.t.hades'a to Kurudes'a. (Skanda VII.i.35,32).

Nis.a_da ra_s.t.ra is the region where Sarasvati_ concealed herself (MB, Vana Parva CXXX,3-5); the region became known as pa_pa b hu_mi (Skanda IV.i.50.64). One surmise is that the Nis.a_da ra_s.t.ra extended from Vinas'ana to Pa_riya_tra (Vindhya and A_ravalli mountains) (H.C.Raychaudhuri, *Political History of Ancient India*, p. 507).

Manusmr.ti (II,18-20) notes that Brahma_varta was the region between the rivers Sarasvati_ and Dris.advati_. This region is also referred to as kuru ja_n:gala, the forest region: sarasvati_ dr.s.advatyorantare kuru ja_n:gale (Skanda I.ii.65.20). The kha_n.d.ava forest is also association with the kuru region, where Yudhis.t.hira founded the city of khan.d.avaprastha (Skanda II.i.29,10). This was obtained as Pa_n.d.ava's share from Dhr.tara_s.t.ra (Skanda II.i.29,9-10). The legend has it that Arjuna burnt this forest with the help of Kr.s.n.a. This was the forest where Indra at the instance of Va_sudeva, asked Vis'vakarma to built a town called kha_n.d.avaprasthapura; it was also known as indraprastha or s'akraprastha (Skanda II.i.29, 12; III.i.21.26,29; III.i.21.47; VII.i.107.97). Sometimes, kuruja_n:gala is associated with Muzaffarnagar district of U.P. (ABL Awasthi, 1965, *Studies in Skanda Purana*, Part I, Lucknow, Kailas Prakashan, p. 171). "…as early as the age of the Su_tras, we find, in the Dharmasu_tra of Baudha_yana, A_rya_varta or the country of the Aryans (which is practically identical with the country later on known as Madhyades'a) described as lying to the east of the region where the river Sarasvati_ disappears, to the west of the Ka_lakavana or Black Forest (identified with a tract somewhere near Praya_ga) (Majumdar, S.N., ed., Cunningham's Ancient Geography of India, Intro., pp. XLI, and xli f.n.I), to the north of Pa_ripa_tra and to the south of the Himalayas (Baudha_yana I.1.2.9; Vasis.t.ha I.8)…The Dharmas'a_stra of Manu, however, calls the A_rya_varta of the Su_tras to be the Madhyades'a or Middle country. Thus, he defines it as extending from the Himalayas in the north to the Vindhyas in the South, and from Vinasana (the place where the Sarasvati_ disappears) in the west to Praya_ga in the east (Himavad-Vindhyayor-madhyam yat pra_k vinasana_d api pratyag-eva praya_gas'ca madhyades'ah…). The Ka_vyami_ma_m.sa_…however designates the A_rya_varta of the Su_tras and Madhyades'a of Manu as Antarvedi_ (Vinasana Praya_gayoh Gan:ga_-Yamunayos'ca antaram Antarvedi_)(Ka_vyami_ma_m.sa, p.93) which extends upto Benares in the east…The ancient Kuru country…was situated between the Sarassati_ on the north and Drishadvati_ on the south…It is stated in the Ja_takas (Nos.413 and 495) that the ruling dynasty belonged to the Yudhit.t.hila gotta (i.e., the family of Yudhis.t.hira. Of kings and princes of the

Kurus mention is made of the following in the Ja_takas: Dhananjaya Koravya…Koravya…and Sutasoma (Maha_sutasoma Ja_taka)…Assaka (one of 16 maha_janapadas of Jambu_dvi_pa) represents the Sanskrit As'maka (or As'vaka) has been mentioned by Asan:ga in his Su_tra_lan:ka_ra as a country in the basin of the Indus. Asanga's As'maka seems, therefore, to be identical with the Kingdom of Assakenus of the Greek writers which lay to the east of the Sarasvati_ at a distance of about 25 miles from the sea on the Swat Valley" (B.C.Law, 1932, *Geography of Early Buddhism*, Kegan Paul, Trench, Trubner and Co. Ltd., London, p.1, p. 18, p.21).

Barbarike emporium or Bhambura. "The ruined town of Bambhora, or Bhambura, is situated at the head of the Ghara creek, which is supposed by the natives to be the site of the most ancient seaport of Sindh…According to the traditions of the people, the most westerly branch of the Indus once flowed past Bhambura. It is said to have separated from the main river just above Thatha…it would appear that the Ghara river was the most westerly branch of the Indus down to the latter half of the last century (18^{th} cent. AD)…M'Murdo quotes native authors to show that this western branch of the Indus was called the Sa_ga_ra river, which, he thinks, may be identified with the Sagapa Ostium of Ptolemy, which was also the most westerly branch of the Indus in his time. It is therefore quite possible, as supposed by M'Murdo that this was the very branch of the Indus that was navigated by Alexander…(Periplus) describes the middle branch of the Indus as the only navigable channel in his time upto Barbarike, all the other six channels being narrow and full of shoals….The middle mouth of the river, which was then the only navigable entrance, is called Khariphon Ostium by Ptolemy. This name I would identify with the Kya_r river of the present day, which leads right up to the point where the southern branch of the Ghara joins the main river near Laribandar…By this channel, in the time of the author of the 'Periplus', the merchant vessels navigated the Indus upto Barbarike, where the goods were unloaded and conveyed in boats to Minnagar, the capital of the country. But after some time this channel also failed, and in the beginning of the eighth century, when the Arabs invaded Sindh, Debal had become the chief port of the Indus, and altogether supplanted Bhambura, or the ancient Barbarike. But the Ghara river was no longer a navigable channel, its waters still continued to flow past the old town to down the thirteenth century, about which time it would appear to have been finally deserted…Kutch. Kotis'vara is the name of a celebrated place of pilgrimage on the western shore of the Kutch…on the bank of the Kori branch of the Indus, and close to the great Indian Ocean."(A. Cunningham, *The*

Ancient Geography of India, Delhi, Low Price Publications, repr. 1990, pp. 247-255).

Ra_jas'ekhara, in Ka_vyami_ma_m.sa mentions two Sarasvati_ rivers: one is in the pas'ca_ddes'a and is listed along with rivers such as: va_rtaghni_, mahi_, hid.imba_ (KM XII.p.227, lines 3-4); another is in the uttara_patha and flowed along with the rivers such as: gan:ga_, sindhu, s'atadru, candrabha_ga_, yamuna_, i_ra_vati_, vitasta_, vipa_s'a_, kuhu_, devika_. The river in the uttara_patha is the Vedic Sarasvati_. The river in the pas'ca_ddes'a is the Sarasvati_ emanating from the A_ravalli ranges. The river of recent times from the A_ravalli ranges passing through Sidhpur (where a Sarasvati_ temple is located) to join the Little Rann of Kutch is described as follows: "Sarasvati_ (2)—A small but holy river of Western India, rising at the south-west end of the A_ra_valli range near the shrine of Amba Bhawa_ni_ and flowing south-westwards for about 110 miles, through the lands of Pa_lanpur, Ra_dhanpur, Mahi_ Kantha, and Baroda, and past the ancient cities of Pa_tan, Anhilva_da, and Sidhpur, into the lesser Ran of Kutch, near Anvarpur. West of Pa_tan its course is underground for some miles, and its stream is small, except in the rains. The river is visited by Hindus, especially those who have lost their mothers. Sidhpur is considered an especially appropriate place at which to perform rites in honour of a deceased mother." (The *Imperial Gazetteer of India*, Vol. XXII, p. 97).

Sa_rasvata is cited as the son of Sarasvati_ and Dadhi_ca. (Va_yu Pura_n.a LXV.91: sa_ravatah sarasvatya_m dadhica_c co papadyate; Brahma_n.d.a Pura_n.a 3.1.94: sa_rasvatah sarasvatya_m dadhi_casyo dapadyat). Maha_bha_rata endorses this citation. The legend: a severe drought lasting for 12 years occurred and resulted in famine and people losing their sources of livelihood. Since many bra_hman.as could not study Vedas for want of food, the vedic knowledge was lost. Only Sa_rasvata was immune from this famine since his mother fed him fish and saved his life. When the famine and drought were over, Sa_rasvata taught the Vedas to the bra_hman.as. (S'alya Parva, LII.2-51). Sa_rasvata was enjoined by gods to study the Vedas and impart Vedic knowledge to others. (S'a_nti Parva, CCCLIX,38ff). As'vaghos.a, in *Buddhacarita* (1.42) refers to this Sa_rasvata legend: sa_rasvatas'ca_pi jaga_da nas.t.am vedam punar ayam dadr.s'urna pu_rve yva_sas tathainam bahudha_ caka_ra na yam vasis.t.hah kr.tava_n asa'tih. As'vaghos.a also refrers to this episode in Saundara_nanda Ka_vya (7.31): tatha_ngira_ ra_gapari_taceta_h

sarasvati_ brahmasutah sis.eve sa_rasvato yatra suto sya jajn~e nas.t.asya vedasya punah pravakta_.

Ba_n.a, in Hars.acarita (1.61ff) provides an alaborate account of the lineage of his family tracing his descent from Sarasvati_. Ba_n.a was born of Citrabha_nu whose ancestors were: Arthapati, Kubera and Va_tsya_yana. The entire legend: In the Bha_rgava Brahmin family, Vatsa was born to Aks.ama_la_. Sage Va_tsya_yana was born in this Vatsa family. After a significant lapse of time, Kubera was born in this lineage. Kubera had four sons: Acyuta, I_s'a_na, Hara and Pa_s'upata. Pa_s'upata's son was Arthapati. Arthapati had eleven sons: Bhr.gu, Ham.sa, S'uci, Kavi, Mahi_data, Dharma, Ja_tavedas, Citrabh_nu, Tryaks.a, Mahi_data and Vis'varu_pa. Citrabha_nu was Ba_n.a's father. Ba_n.a notes that Kubera was devoted to the Vedas, sacrifices and other s'a_stras.

> The ancient economic court was dominated by plant products such as fragrances, incenses and exudations which were highly valued and in great demand. For example, the ancient Egyptian civilization records trans-continental expeditions to pw'nt (or punt) in search of such plant products which may be designated as Kube_ra's nava-nidhi or nine treasures of Kube_ra, in the yaks.a tradition of great antiquity.



Ramghat, Yaks.a Kubera, ca. 4th cent. AD; spotted red sandstone; Kus.a_n.a style; hand raised in abhaya mudra, wearing , waistband and scarf, wearing armlets and necklaces; Mathura Museum (18.1506) (After Harle, J.C., 1973, Late Kusan, early Gupta: a reverse approach, in: Norman Hammond, ed., South Asian Archaeology, Duckworth, London, Pl. 17.3)

Vatsa, the ancestor of Ba_n.a's family, was the cousin of Sa_rasvata, the son of Dadhi_ca and Sarasvati_. Vatsa was born to Aks.ama_la_; Sa_rasvata was born to Sarasvati_. Sarasvati_ had blessed Sa_rasvat with complete knowledge of Vedas: samyaksarahasya_h sarve veda_h sarva_n.i ca s'a_stra_n.i sakala_s'ca kala_ mat prabha_va_t svayam a_virbhavis.yanti iti varam ada_t. Sa_rasvata infused the entire learning into Vatsa.

Ba_n.a recounts the legend of Sarasvati_ and Dadhi_ca as follows: Dadhi_ca was the son of Cyavana r.s.i and Sukanya_, daughter of King S’arya_ta. Dadhi_ca’s father was a r.s.i who performed penance at a place four miles from S’on.a. Sarasvati_ was the daughter of Brahma_ and resided in Brahmaloka (heaven). In a sadas (discussion group) presided over by Brahma a controversial topic arose. Durva_sa and another r.s.i Upamanyu got into an argument; during this process, Durva_sa struck a discordant note while reciting a sa_man. Sarasvati_ who was present could not contain her amusement at the error committed by the r.s.i Durva_sa and burst out into laughter. This behaviour of Sarasvati_ in a public session angered Durva_sa who cursed Sarasvati_ to descend to the earth: durvini_te vyapanaya_mi te vidya_janita_m unnatim ima_m adhasta_d gaccha martyalokam. Brahma intervened and mitigated the effect of the curse by limiting the punishment on Sarasvati_ to live on the earth only upto the birth of a son: **vatse sarasvati_ vis.a_dam ma_ ga_h…a_tmajamukhakamala_valokana_vadhis’ca te s’a_po yam bhavis.yati iti.** [S’arya_ta was the King of A_narta (Gujarat region) and he performed austerities near river Narmada_ and the Vaid.u_rya mountain (the western portion of the Sa_tpura range). Paras’ura_ma is said to be of the S’u_rpa_raka region (near Bombay) and Us’anas-S’ukra is located in the region near Pratis.t.ha_na (Allahabad), the kingdom of Yaya_ti. Kapa_lamocana on the river Sarasvati_ (near Adh Badri) is said to be the ti_rtha of Us’anas, called Aus’anasa Ti_rtha (MB 9.38.4)]. [The Pura_n.as also contain a reference to Kala_pagra_ma situated close to the source of the River Sarasvati_, which is a tributary of the Alaknanda_ in Badrinath in W. Garhwal. This place is located on the eastern part of the Himalayas (Va_yu Pu_rva 41.43, 1.170; Na_rada P. II.67.6), close to Badarika_s’rama (or Badarya_s’rama) where Manu performed yogic miracles. (Va_yu Utt. 26.209). Brahama_n.d.a P. (Madhya. Upo. 63.210) locates this place in the Uttara Kuru region, at the base of the Gandhama_dana mountain (Arjuna on his way to Mount Kailasa to perform tapas crossed this mountain: MBH. Vana Parva, Ch. 37, Verse 41; there is a Badari tree close to which is an a_s’rama of Narana_ra_yan.as where Yaks.as also always stay: MBh. Vana Parva, Ch. 141, Verse 22). The Gandhama_dana mountain is a peak in the Meru range of mountains. Kala_pagra_ma is a village where Maru and Deva_pi, the last kings respectively of the solar and lunar races, performed tapas to reappear again as the kings of Ayodhya_ and Hastina_pura after Kalki conquers the Mleccha kingdom. (Kalki P. III.Ch.4).]

The next day, Sarasvati_, accompanied by Sa_vitri_ set out for the earth. She followed the path of Manda_kini_ (which together with Alakananda and Bha_gi_rathi_ were the branches of Gan:ga_ in the Pauri-Garhwal region in Himalayas) and got down to the earth. Sa_vitri_ advised Sarasvati_ to settle down on the western bank of the S'on.a (also called Hiran.yava_ha). They spent some days on the banks of the S'on.a. [This reference to S'on.a is in accord with the citation in Bha_gavata Pura_n.a V.19.18].

Sarasvati_ River is mentioned in 15 s'lokas in Srimadbha_gavatam while describing the pilgrimages of Vidura and Svayambhava Manu along the course of the River. On the banks of the Sarasvati_ River, Vya_s met Sage Na_rada and held a long discussion.

Brahmanadya_m sarasvatya_m a_s'ramah pas'cime tat.e
S'amya_pra_sa iti prokta r.s.i_n.a_m satravardhanah (2.7.1)

The Sarasvati is a Brahmanadi as on its banks thousands of sages observe Brahmopa_sana (meditation). There is a famous hermitage called S'amya_s'ram on the western bank where sacrifies are performed.

Vya_sa composed the Great Epic, Maha_bha_rata on the banks of the Sarasvati_ River.

Kala_pagrama_ is a pilgrimage site on the banks of the river Sarasvati_. It is situated on the eastern part of the Himalayas near Badarika_s'rama (Va_yu Pu_rva. 41/43) where Manu performed yogic feats. (Bha_gavata Pura_n.a X 87/7). Bra_hma_n.d.a Pura_n.a (Madhya. Upo. 63/210) locates the place in Uttaqrakuru at the base of the Gandhama_dana mountain (a peak of the Meru mountain range). The last kings of the solar and lunar races, Maru and Deva_pi, respectively, are stated to have performed penances to reappear again as the kings of Ayodhya_ and Hastina_pura after the subversions of the Mleccha kingdom by Kalki (Kalki Pura_n.a III. Ch.4). It is situated near the source of Sarasvati_ river, a tributary of the Alaknanda_ in Badarina_tha in Garhwal. (*Asiatic Researches*, Vol. XI, p. 524).

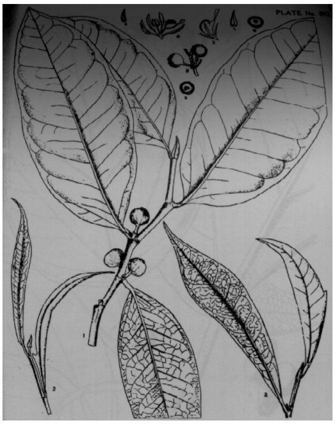
One day, Dadhi_ca, while returning to his father's hermitage chanced upon the abode of Sarasvati_ and Sa_vitri_. After some days, Dadhi_ca send his messenger Ma_lati to Sarasvati_ communicating his love for Sarasvati_. In due course, this love blossomed into a conjugal relationship. Dadhi_ca spent more

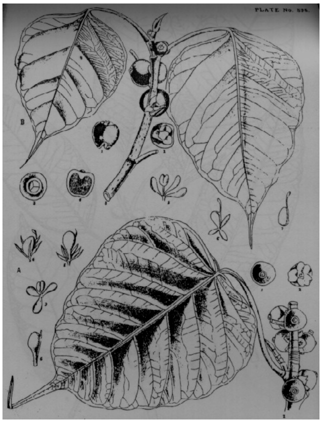
than a year like a day in the company of Sarasvati_ on the banks of the S'on.a Sarasvati_ and gave birth to Sa_rasvata and returned to heaven. Separated from Sarasvati_ Dadhi_ca lost interest in worldly life and retired to the forests as an ascetic.

Plaks.a

Ficus Gibbosa or infectoria or caulocarpa or caulobotrya or urostigma stipulosa (After Basu, B.D., 1913, *Indian Medicinal Plants,* Pt. IV, Pl. 892)

Ficus rumphii or cordifolia (After Basu, B.D., 1913, *Indian Medicinal Plants,* Pt. IV, Pl. 896B) This monumental work provides the following details about this plant. Distribution: Punjab, N. India, Assam, Burma, Central India, W. Peninsula, S. India, Malay Peninsula, Malay Archipelago. A moderate sized deciduous tree at first usually epiphytic, all parts glabrous…The Santals use the fruit as a drug. The juice is used in the Konkan to kill worms and is given internally with turmeric, pepper and ghi, in pills, the size of a pea, for the relief of asthma; it causes vomiting. Names: Assam: pakri; Bengal: gaiaswat, galasvattha; Burma: nyaungbyu; Cachar: satbur; Canarese: bettaarali, bettaragi, kadarali; garwal: kabaru; garo: prab; Hindi:







gagjaira, gajiun, gajna, kabar, khabar, pakar, pilikhan, papal, pipul; jaunsar: pilkhoi; kolami: sumanpipar; Kumaon: kabaipipal; Lohardugga: ganjar, kabaipipal, sumanpipar; Marathi: asht, ashta, pair, payar; Mundari: duranggahesa; Nepal: pakar; Punjab: badha, palak, pilkhan, pulakh, rumbal; Rajputana: paraspipal; Santali: sunamjor. The sp. shown in Plate 896A is described as ficus religiosa with distribution in sub-Himalayan forests, Bengal, Central India and is referred to variously as asvattha or

papal; Kolqamui: hesar, hissa, pipar; Konkani: pimpoll; Santal: hesak; Tulu: attasa; Uriyua: osto, oshwottho, pippolo, usto.

> itti white fig, ficus infectoria, ficus gibbosa prarasitica; tailed oval-leaved fig, ficus talboti; icci oval-leaved fig; jointed ovate-leaved fig, ficus tsiela; icciya_l, iccil jointed ovate-leaved fig; iratti jointed ovate-leaved fig; subserrate rhomboid-leaved fig, ficus gibbosa tuberculata; iratakam jointed ovate-leaved fig; ir-ali = white fig; ir-r-I tailed oval-leaved fig (Ta.); itti, ittiy-a_l waved leaved fig-tree, ficus venosa; a parasitical plant, loranthus coriaceus (Ma.); itti ficus gibbosa (Kod.)(DEDR 460).

> cuvalai papal; cuvi white fig, ficus infectoria; stone fig, ficus gibbosa parasitica (Ta.); cuvann-a_l ficus infectoria (Ma.); juvvi mara wavy-leaved fig tree, ficus infectoria (Ka.); ficus tsiela (Te.); papal, ficus religiosa (Kol.); ju_ meri sp. ficus religiosa (Pa.); ju_ ma_r.a ficus sp. (Go.)(DEDR 2697).

Ficus lacor, Linn. Or ficus infectoria Roxb. (After Basu, B.D., 1913, *Indian Medicinal Plants*, Pt. IV, Pl. 897). The work describes the medicinal plant as a large spreading deciduous fast-growing tree, all parts glabrous…Distribution: plains and lower hills of India, Ceylon, Malaya; all parts are acrid, pungent, cooling; useful in diseases of the blood and the vagina, ulcers, burning sensations, biliousness, kapha, inflammations, leprosy, hallucinations, loss of consciousness (Ayurveda)…the fruit is sour; the seeds are useful in bronchitis, biliousness, scabies, boils, inflammation (Yunani). The bark of this, along with the barks of other four species of Ficus and of Melia azadarichta, pass by the name of Panchavalkala (or the five barks); they are used in combination. A decoction is much employed as a gargle in salivation, as a wash for ulcers, and as an injection in leucorrhoea. Names: Bengal: pakar; Bombay: bassari, pakri, pipli; Burma: nyaungchin; Canarese: basari, basarigoli, juvvi, kabbasari, karibasri, plaksha, ulabasari; garo: prab; Gond: serelli; Gujarati: pepri; Hindi: kahimal, khabar, pakar, pilkhan, ramanjir; Kolami: baswesa; Konkani: killah; Kurku: pepere; Lambadi: katpipri; Malayalam: bakri, chakkila, chuvannal, itti, jati; Marathi: bassari, dhedumbara, gandhaumbara, lendwa, pakari, pepar; Mundari: basuhesa, dindaputkal, gusahesa, gusihesa, hesaputukaldaru, jojohesa; Nepal: safedkabra; NW Provinces: pakur; Punjab: bathar, janglipipli, pakhar, palakh, palkhi, p;ilkhan, pilkin; Sanskrit: ashvatthi, charudarshani, dridhapraroha, gardabhanda, jati, kandaralu, karpari, parkati, pimpari, plaksha, plavaka, shringi, suparshva,

varohashakhi, vati; Saora: juvvi; Sinhalese: kalaha, kiripella; Tamil: jovi, kallal, kurugatti, kurugu, suvi; Telugu: badijuvvi, jati, juvvi; Tulu: basarigoli; Urdu: pakharia; Uriya: pakodo, rushorchona.

It is very complex indeed to precisely identify the ficus species intended by the various lexes used in Indian languages. However, considering the consistency with which the word, plaks.a is used for ficus infectoria, it would appear that the plant referred to is the one shown in Plate 897, i.e., the ficus lacor or, Linn. Or ficus infectoria, Roxb. This is confirmed by the use of the roots of Ficus infectoria as poultice on wounds in the Philippines, comparable to the external applications in Indian Medicine. (Quisumbing, E., 1978, *Medicinal Plants of the Philippines*, Manila, Katha Publishing Co., p. 237).

The lexeme **plaks.a** is explained in Monier Williams' Sanskrit lexicon in the following terms: the waved-leaf fig-tree, ficus infectoria (a large and beautiful tree with white fruit), AV.; dvi_pa (Pur.); (with prasravan.a, Ta_n.d.Br. name of the river Sarasvati, MBh; plaks.aga_ name of a river, VP; plaks.aja_ta_ rising near the fig-tree, name of the Sarasvati,l MBh; plaks.ati_rtha, plaks.a_vataran.a name of a place of pilgrimage Hariv.MBh.Ma_rkP.; plaks.atva the state or condition of being a fig-tree, MaitrS.; plaks.anyagrodha, du. Ficus infectoria and ficus indica, Pa_n. ii,2,29; plaks.asravan.a, plaks.aprasravan.a, plaks.ara_j, plaks.ara_ja source and king of the fig-tree, name of the place where the Sarasvati rises; plaks.avat surrounded by fig-trees, name of a river (prob. The Sarasvati); plaks.as'a_kha_ branch of the fig-tree, MaitrS.; plaks.asamudhbhava_, plaks.aja_ta_, plaks.a samudra-vacaka_ name of the river Sarasvati_; plaks.o_dumbara a species of tree, Kaus'.; pla_ks.a being or relating to or coming from the ficus infectoria, TS; AitBr; pl. the school of Pla_ks.i, Pa_n. iv, 2,112,Sch.; the fruit of the fig-tree, L.; pla_ks.aprasravan.a name of the place where the Sarasvati_ rises; pla_ks.i, pla_ks.aki, pla_ks.a_yan.a fr. plaks.a TA_r., TBr. Pa_n. iv,1,65,Sch. Plaks.ara (formed to explain plaks.a) caus. Praks.a_rayati to cause to stream forth, pour out, MaitrS.

Plaks.apras'ravan.a is mentioned in the context of a s'ra_ddha, while describing the glory of Kuruks.etra for the performance of ceremonies paying homage to ancestors, i.e. performing s'ra_ddhas. The place is said to have been situated on the River Sarasvati_ in the Himalayas. (Va_yu Utt. 15.67; Padma P. Uttara 128.170, 129.25; Ku_rma P. II.37.29; Ma_rk. P. 21.29). Puru_ravas (a prominent king of the lunar vam.s'a) saw U_rvas'I_ bathing in a pond at Plaks.ati_rtha. He married her and got eight sons: A_yus, Dr.d.ha_yus,

Vs'ya_yus, Dana_yus, Vr.ttima_n, Vasu, Divija_ta and Suba_hu. Of these A_yus later became the propagator of the dynasty. Nahus.a was a son of A_yus. Iks.va_ku gave Puru_ravas a sword which in his old he gave to his son A_yus. (Padma P. Ch. 12, Bha_ga 3). Plaks.a_vatarn.a is also a sacred spot at the place of origin of Yamuna_; this was worshipped by Bharatas as a gate of Heaven. (MBh. Vana Parva, Ch. 90, Verse 4).

Balarama's pilgrimage: ancient geography of Sarasvati River Basin

The account of the pilgrimage reported in extensive detail in the S'alya Parva of the Maha_bha_rata is an outstanding example of the great epic being the sheet anchor of ancient Indian history. The account is in response to Janamejaya's query: 'Tell me the characteristics, the origin, and the merits of the several ti_rthas on the Sarasvati_ and the rites to be performed while going there.' (MB h. 5.35.35).

The account is very comprehensive and lists a number of places along the course of the Sarasvati_ river, providing details of the flora and fauna of the various regions along the river basin, the legends of the kings and ascetics who had lived on the banks of the river and a succinct account of the importance of the pilgrimage places, called ti_rthas together with the associated sthala pura_n.as. The account of the pilgrimage also establishes the inherent link between the great epic and the Vedic tradition. Many legends are paralleled in the legends mentioned or briefly indicated in the r.cas of the four Vedas. The legends thus provide the continuous link between the days when the battle at Kuruks.etra was fought and the earlier Vedic age, for some legends do relate to Satya yuga and kr.ta yuga. It is a rich source to rediscover the geophysical features and the evolutionary history of the great Himalayan river, Sarasvati_.

A summary of place names, in due order, together with names of regions and clans of people, and associated sages and kings provided by this pilgrimage account is recounted as follows, which in fact, establishes the course of the Sarasvati_ river from Prabhas to Yamuna, i.e. from the Arabian Sea in the west to the Yamuna river in the northeast; the journey took 42 days:

- Dwa_raka (accompanied by Vr.s.n.i and Yadavas)
- Prabha_sa (Soma, moon)
- Camasobheda

- Udapa_na (Sarasvati_ not visible; she is an invisible current below the earth; Sage Trita, son of Gautama; sacred well)
- Vinas’ana (where Sarasvati_ disappeared; s’udras, abhiras)
- Subhu_mika (Apsaras, Gandharvas)
- Gandharva ti_rtha (Vis’vavasu)
- Gargas’rota (Sage Garga, astronomer and jyotis.a s’a_strajn~a)
- S'ankha ti_rtha (tree called
- maha_s'ankha; vra_tyas, siddhas, yaks.as, vidhya_dharas,
- ra_ks.asas and pis'a_cas)
- Dwaita lake (ascetics dressed diversely)
- [Along the southern bank of the Sarasvati_]
- Na_gadhanwana ti_rtha (snakes, Vasuki; 'four and then ten thousand r.s.is lived there permanently)
- [Setting out toward the east]
- Spot where Sarasvati_ turns eastward (forest of Naimis.a; Satya yuga sages)
- [ti_rthas on the southern bank of the Sarasvati_ all looked like towns and cities, upto
- Samantapan~caka; celebration of agnihotras; Va_likhilyas and As'makut.t.as, Dantolukhalinas, Sampraks.yan.s and other ascetics]
- Sarasvati_once more flowed in a westerly direction [reservoirs of water in Naimis.a and in Kuruks.etra]
- Sapta-Sarasvat ti_rtha [Sage Mankanaka, son of Va_yu and Sukanya; Vadari, Vibhitaka, Kakkola, Palas'a, Karira, Pilu, plantains and various other kinds of trees grow on the banks of the Sarasvati_;forests of Karushakas, Vilwas, and Amratakas and Atimuktas and Kas'andas and Parijatas].
- These are seven forms of the Sarasvati_, viz., Suprabha (Pus.kara), Ka_n~cana_ks.i (Naimis.a), Vis'a_la (Gaya), Manorama (Ouddalaka, kos'ala), Oghavati (kuruks.etra), Suren.u [Daks.a; at the source of Ganga], and Vimalodaka (Himavat forest; Brahman]
- Us'anas [also called Kapa_lamochana [Rama, ra_ks.asa Mahodara, Sage S'ukra: science of morals and politics; Rama killed Mahodara at Janastha_na, dan.d.aka]
- Rus'angu's hermitage (northern bank of Sarasvati_) [Ars.t.is'ena; Vis'va_mitra]
- Mountains called Lokaloka [Sage Ars.t.is'ena, Sage Sindhudvipa, Sage Devapi, Vis'va_mitra: legends of Krita age; Vasis.t.ha and S'avaras]

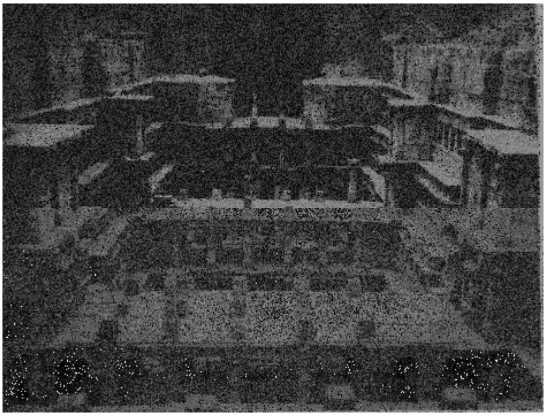
- Vaka's hermitage (close to Lokaloka; Dalvya-vaka, Dhritara_s.t.ra, son of Vicitravi_rya)
- Yayata ti_rtha (Yayati, son of Nahus.a; reference to Rigvedic r.ca]
- Ti_rtha of fierce current called Vasis.t.hapavaha [Vasis.t.ha, Vis'va_mitra who had hermitages on opposite banks of the river]
- Sarasvati_ flowed mixed with blood
- Assumes a new form called Arun.a [Indra, Namuci]
- Ti_rtha of Soma [Soma, Atri the priest; Asura Taraka killed by Skanda; huge as'vattha tree where Ka_rttikeya always lives]
- Samantapan~caka ti_rtha (Northern altar of Brahman.as; Kumara, Varun.a; Satya Yuga) [Same area as Kuruks.etra, the space between Tarantuka and Arantuka and lakes of Rama and Camacakra: MBh. S'alya 5.53.2]
- Taijisa ti_rtha [Varun.a]
- Agni ti_rtha
- Brahmayoni [Brahma]
- Kauvera ti_rtha [Ailavila, Kuvera, Nalakuvara]
- Vadarapachana ti_rtha [S'ruvavati, daughter of Bharadwaja and Apsaras Ghr.taci_; seven r.s.is had left Arundhati while they went to Himavat]
- S'akra ti_rtha
- Rama ti_rtha
- Yamuna ti_rtha
- A_ditya ti_rtha [Vis.n.u slaying Madhu and Kaitabha; Vya_sa; Sage Asitadevala and Sage Jagis'avya]
- Soma ti_rtha
- Sarasvat ti_rtha [Dadhica, gandharvas and apsaras]
- Hermitage of daughter of S'a_n.d.ilya
- Ascending the Himavat
- Plaks.apras'ravan.a
- Karapavana ti_rtha
- Hermitage of Mitravarun.a
- Ti_rtha of daughter of Kuni-Garga [adored the Pitr.s and gods]
- Reaches Yamuna where Indra, Agni and Aryaman had obtained felicity.

These are the details provided by the great epic about the course of the Sarasvati_ river and the pilgrimage places visited by Balarama, from Dwaraka to the birthplace of Yamuna, now called Yamunotri.



Balara_ma on a stone panel at the massive structure of the 'Rani ki Ba_w' at Pa_t.an., Gujarat, on the banks of River Sarasvati which joins the Little Rann of Kutch. The image is surrounded by a depiction of das'a_vata_ra images. The name, 'Pa_t.an.' (which was also an ancient capital city of Saurashtra – Cha_vd.a_ Nares. Vanara_j, 745 AD) is significant and indicates that in ancient times, together with Dholavira and Surkotada, Patan was a river port.

This is known as the step-well. The seven-storeyed structure skirts around a deep well. The wonderful structure which is unparalleled in the history of architecture of any civilization, is adorned with panels of sculptures with deities dating back to the Vedic age. The structure is 63m. long, 17.5m. wide and 28 m. deep. Was this the ancient site of 'Udapa_na well' which Balara_ma visited during his pilgrimage? (Narayan Vyas, 2000, Rani ki Ba_w, in: KD Bajpai, Rasesh Jamindar and PK Trivedi, eds., *Gleanings of Indian Archaeology, History and Culture: Prof. Dr. RN Mehta Commemoration Volume*, Jaipur, Publications Scheme, Plate VI, fig. 4 and Plate III, fig. 1).



Ti_rthas of River Sarasvati_

Maha_bha_rata : S'alya Parva (Gada_yuddha parva) describes the ti_rthas of River Sarasvati_

Sanjaya said: 'When that fierce encounter O king, was about to take place…Rama, whose banner bore the emblem of the palmyra palm, and who had the plough for his weapon, came there…Rama then said, --'two and forty

days have passed since I left home. I had set out under the constellation Pus.ya and have come back under S'ravan.a…'(MBh. 5.34.1-6)

Janamejaya said: 'On the eve of the great battle (between the Kurus and the Pan.d.us) Rama, with Kes'ava's permission, had left Dwaraka accompanied by many of the Vr.s.n.is… (MBh 5.35.1)

Vais.ampa_yana said: (Rama said to Kris.n.a) "O mighty-armed one, O slayer of Madhu, let us help the Kurus". Kris.n.a, however, did not pay heed to those words of his. (MBh. 5.35.12).

Enraged at this, that illustrious son of Yadu's race, viz., the wielder of the plough, then started on a pilgrimage on the Sarasvati_. (MBh. 5.35.13).

Accompanied by all the Yadavas, he set out under the conjunction of his asterism called Maitra. The Bhoja chief (Kritavarman), however, took the side of Duryodhana. Accompanied by Yuyudha_na, Vasudeva took that of the Pa_n.d.avas. (MBh. 5.35.14).

After the heroic son of Rohin.i had started under the constellation Pus.ya, the slayer of Madhu, placing the Pa_n.d.avas in his van, went against the Kurus. (MBh. 5.35.15).

While proceeding, Rama ordered his servants on the way, saying—"Bring all the necessary articles of use for a pilgrimage. Bring the sacred fire that is at Dwaraka and our priests.

Bring gold, silver, kine, rubes, horses, elephants, cars, mules, camels, and other beasts of burden.

Bring all thrse necessaries for a sojourn to the sacred waters, and proceed quickly towards the Sarasvati_. (MBh. 5.35.16-18).

Bring also some priests for the performance of a special rite, and hundreds and hundreds of best Brahman.as." Having given these orders to the servants, powerful Baladeva started on a pilgrimage at that time of great danger to the Kurus. Setting out towards the Sarasvati_, he visited all the sacred shrines along her course, accompanied by priests, friends, and many leading Brahman.as, as also with cars and elephants and horses and servants, O best of

Bharata's race, and with many vehicles drawn by kine and mules and camels. (MBh. 5.35.19-21).

Various sorts of necessaries of life were distributed profusely in various countries amongst the weary and worn, children and the old, in response, O king, to their prayers. (MBh. 5.35.22).

Everywhere, O king, Brahman.as were sumptuously fed with whatever they wanted. At the command of Rohin.i's son, men, at different stages of the journey, stocked sufficient food and drink. (MBh. 5.35.23-24).

Costly garments and bedsteads and coverlets were distributed among the Brahman.as desirous of ease and comfort. (MBh. 5.35.25).

Whatever a Brahman.a or Ks.atriya wanted, it was given to him. (MBh. 5.35.26).

The party thus proceeded with great happiness and lived happily. Valarama's suite gave away vehicles to persons desirous of making journeys, drinks to them that were thirstly, and rich food to them that were hungry, as also raiments and ornaments, O best of Bharata's race, to many. (MBh. 5.35.27-28).

The road, O king, along which the party proceeded, looked resplendent, was highly comfortable for all, and resembled heaven itself. (MBh. 5.35.29).

There were rejoicings everywhere and rich food was procurable everywhere. There were shops and stalls and various objects were kept there for sale. The entire way was thronged with human beings. And it it was decorated with various kinds of trees and creatures, and various kinds of gems. (MBh. 5.35.30).

The great Baladeva, observing rigid vows, distributed amongst the Brahman.as profuse wealth and plentiful sacrificial presents, O king, at various sacred places. (MBh. 5.35.31).

That chief of Yadu's race also distributed thousands of milch kine covered with excellent cloths and having their horns coated with gold, many horses born in different countries, many vehicles, and many beautiful slaves. (MBh. 5.35.32-33).

Thus did great Rama distribute wealth in various sacred shrines on the Sarasvati_. In course of his travels, that noble hero of matchless power at last came to Kuruks.etra. (MBh. 5.35.34).

Janamejaya said: Describe to me, O foremost of men, the characteristics, the origin, and the merits of the several ti_rthas on the Sarasvati_ and the rites to be performed while going there. (MB h. 5.35.35).

Tell me these, in their order, O illustrious man. My curiosity is not to be satisfied, O foremost of all persons conversant with the knowledge of Brahman. (MBh. 5.35.36).

Vais'ampa_yana said: The account of the characteristics and origin of all these ti_rthas, O king, is very lengthy. I shall, however, describe them to you. Listen to that sacred account, O king. (MBh. 5.35.37).

Accompanied by his priests and friends, Baladeva first went to the ti_rtha called Prabha_sa. There, the Lord of the asterisms (viz., Soma), who had been suffering from phthisis, was freed from his disease. Regaining energy there, O king, he now lights up the universe. And because that foremost of ti_rthas on Earth had formerly invested Soma again with effulgence, it is, therefore, called Prabha_sa. (MBh. 5.35.38-39)…. [Legend of Soma, Daks.a and the Moon is related].

Janamejaya said: On every day of the new moon, O king, the god (moon), having the hare for his mark, bathes in the excellent ti_rtha of Prabha_sa and regains his form and beauty. (MBh. 5.35.79).

O lord of Earth, that ti_rtha is known by the name of Prabha_sa, because bathing there the moon regained his great (prabha) effulgence. (MBh. 5.35.80).

After this, the mighty and illustrious Baladeva, proceeded to Camasobheda, that is to that ti_rtha which is called by that name. (MBh. 5.35.81).

Distributing many precious presents at that place, the hero, having the plough for his weapon, passed on a night there and performed his ablutions duly. (MBh. 5.35.82).

The elder brother of Kes'ava then speedily repaired to Udapa_na. Although the Sarasvati_ is not visible there, yet persons endued with ascetic success, on account of their obtaining great merits and sanctity of that spot, and also of the coolness of the herbs and of the land there, know that the river has an invisible current, O king, underneath the earth there. (MBh. 5.35.83-84).

Vais'ampa_yana said: "Baladeva proceeded next to the ti_rtha Udapa_na in the Sarasvati_, that had formerly been the habitation, O king, of the illustrious ascetic Trita. (MBh. 5.36.1).

Having distributed profuse wealth and worshipped the Brahman.as, the hero, having the plough for his weapon, bathed there and was filled with joy. (MBh. 5.36.2).

The great and pious ascetic Trita had lived there. While in a hole that great man had drunk the Soma juice. (Mbh. 5.36.3).

His two brothers, dashing him down into a pit, had returned home. That foremost of Brahman.as, viz., Trita, had thereupon cursed them both." (MBh. 5.36.4).

Janamejaya said: "What is the origin of Udapa_na? How did the great ascetic Trita fall into a pit there? Why was that foremost of Brahman.as thrown into that pit by his brothers? (MBh. 5.36.5)…[Legend of Ekata, Dwita, Trita, Gautama (Trita's father) and of how Trita mentally performed the ablutionsj].

(Trita) also said: 'Let him that bathes in this well, achieve the end that is attained by persons that have drunk Soma'. (MBh. 5.36.46).

Thereat, O king, the Sarasvati_, with her waves, appeared within that well. Raised above by her, Trita came up and worshipped the celestials. (MBh. 5.36.47)…

…his two brothers were soon transformed into tigers on account of the curse of that truthful sage. (MBh. 5.36.51).

The highly powerful Baladeva touched the waters of Udapa_na. And he gave awy various kinds of wealth there and worshipped many Brahman.as (MBh. 3.36.52).

Beholding Udapa_na and praising it repeatedly, Baladeva next proceeded to Vinas'ana which also was on the Sarasvati_. (MBh. 5.36.53).

Vais'ampa_ayana said: "Then Baladeva, O king, went to Vinas'ana where the Sarasvati_ has disappeared out of view in consequence of her hatred for s'udras and abhiras. (5.37.1).

And because the Sarasvati_, on account of this contempt, is lost there the Ris.is, O chief of the Bharatas, always name the place as Vinas'ana.

MBh. Vanaparva (80.118) cites that vinas'ana was close to Marudes'a or marusthali_, the desert: tato vinas'anam gaccchenniyato niyata_s'anah gacchatyantarhita_ yatra marupr.s.t.he sarasvati_. Marupr.s.t.ha is the top or head of the Marus and the Sarasvati_ is said to have dried up about here. It is also at the door of the ra_s.t.ra of nis.a_das, that Sarasvati_ lost itself into the earth: dva_ram nis.a_dara_s.trasya yes.a_m dves.a_t sarasvati_ pravis.t.a_ pr.thivi_m...(MBh. Vana. 130.3-4).

Having bathed in that ti_rtha of the Sarasvati_, the powerful Baladeva then went to Subhu_mika situated on the excellent bank of the same river.

There many fair-complexioned and beautiful-faced Apsaras are always engaged in innocent pastimes.

The celestials and the Gandharvas, every month, O king, go to that sacred shrine which is the resort of Brahman himself.

The Gandharvas and various clans of Apsaras are to be seen there, O king, passing their days happily.

There the celestials and departed manes in the midst of the showers of sacred and auspicious flowers sport in joy.

There all the creepers are covered with flowers. And because, O king, that spot is the beautiful sporting ground of those Apsaras, therefore is that shrine on the charming of the Sarasvati_ is called Subhu_mika.

Baladeva of Madhu’s race, having bathed in that ti_rtha and distributed immense riches amongst the Brahman.as, heard the sound of those celestial songs and musical instruments.

He also saw there many shadows of gods, Gandharvas, and Ra_ks.asas. The son of Rohin.i then proceeded to the ti_rtha of the Gandharvas.

There many Gandharvas, headed by Vis’vavasu and possessed of ascetic merit, pass their time in dance and singing many sweet songs (MBh. 5.37.2-11)…

Leaving that ti_rtha the favourite haunt of the Gandharvas, that mighty-armed chastiser of foes, having but one ear-ring, then went to the famous ti_rtha called Gargas’rota. (MBh. 5.37.14).

There, in that sacred ti_rtha of the Sarasvati_, the illustrious and old Garga, having a sould cleansed by ascetic penances, O Janamejaya, had mastered the knowledge of time and its course, of the deviations of luminous bodies (in the sky), and of all auspicious and inauspicious portents.

The ti_rtha was called after his name Gargashrota. There, O king, highly blessed R.s.is of firmvows always waited upon Garga, O lord, for acquiring a knowledge of time. (MBh. 5.37.15-17.

Besmeared with white sandal-paste O king, Baladeva, going to that ti_rtha, duly distributed wealth amongst many ascetics of pure souls. (MBh. 5.37.18)

Having distributed also many sorts of rich food amongst the Brahman.as, that illustrious one, clad in blue robes, then went to the ti_rtha called S’ankha.

There, on the bank of the Sarasvati_ that powerful palmyra-emblemed hero beheld a gigantic tree called Mahas’ankha, tall as Meru, looking like the white-mountain, and resorted to by many R.s.is.

There dwell Yaks.as and Vidya_dharas, and Ra_ks.asas of great energy, and Pis’a_cas of incomparable might and Siddhas, in thousands.

Desisting from other kinds of food, all of them observe vows and regulations, and take at the proper time the fruits of that king of the forest for their

sustenance and rove separately unseen by men, O foremost of men! That monarch of the forest, O king, is celebrated throughout the world.

That tree is the cause of this ti_rtha. Having given away many milch cows, vessels of copper and iron, and diverse sorts of other vessels, that foremost Yadu's race, viz., Baladeva, having the plough for his weap;on, worshipped the Brahman.as and was adored by them in return. He, then, O king, went to the Dwaita lake. (5.37.19-25).

Arrived there, Vala saw various ascetics dressed diversely. Bathing in its waters, he adored the Brahman.as.

Having distributed profusely among the Brahman.as various articles of enjoyment Baladeva then, O king, went on along the southern bank of the Sarasvati_.

The mighty-armed and illustrious Rama, of pure soul and unmitigated glory, then proceeded to the ti_rtha called Na_gadhanwana.

Abounding with snakes, O king, it was the abode of the highly effulgent Vasuki, the king of serpents. There four and then ten thousand R.s.is also lived permanently.

Having come there in days of yore the celestials had, according to due rites, installed the great snake Vasuki as king of all the snakes. There is no fear of snakes in that place, O you of Kuru's race.

Duly distributing many valuable articles there amongst the Brahman.as, Baladeva then set out with face towards the east and reached, one after another, hundreds and thousands of celebrated ti_rthas situated all around. (5.37.26-31).

Bathing in all those ti_rthas, and observing fasts and other vows as sanctioned by the R.s.is, and given away immense riches, and saluting all the ascetics who lived there, Baladeva once more set out, along the way pointed out to him by those ascetics for reaching that spot where Sarasvati_ turns in an eastward direction, like torrents of rain bent by the velocity of the storm. The river took that course for seeing the great R.s.is dwelling in the forest of Naimis.a.

Always smeared with white sandal-paste, Vala, having the plough for his weapon, seeing that great river change her course, was O king, filled with wonder. (5.37.32-35).

Janamejaya said: “Why O Brahman.a, did the Sarasvati_ bend her course there towards the east. O best of Addharyus, you should tell me everything regarding this. (5.37.36)… [Vais’ampa_yana relates the legend of the Satya yuga, when the ascetics of Naimis.a were engaged in a sacrifice lasting 12 years…]

Vais’ampa_yana said: “On account of the number of r.s.is, O king, the ti_rthas on the southern banks of the Sarasvati_ all looked like towns and cities.

Those foremost of Brahman.as, O foremost of men, being anxious to enjoy the merits of ti_rthas, took up their abodes on the bank of the river upto Samantapan~caka.

The whole region was as if filled with loud Vedic recitations of those R.s.is of pure souls, all engaged in pouring libations on sacrificial fires.

The best of rivers shone highly beautiful with those burning homa fires all around, over which those great ascetics poured libations of clarified butter. (5.37.41-44).

Va_likhilyas and As’makut.t.as, Dantolukhalinas, Sampraks.yan.s and other ascetics, as also those living on air and those living on water, and those living on dry leaves of trees, and various others who practiced diverse kinds of vows, and those that lived on bare and hard earth, all came to that spot in the vicinity of the Sarasvati_. And they rendered that foremost of rivers highly beautiful like the celestials beautifying with their presence the heavenly rivers called Manda_kini_.

Hundreds of R.s.is, all given to the observance of sacrifices, came there. Those observers of great vows could not find sufficient accommodation on the banks of the Sarasvati_.

Measuring small plots of land with their sacred threads, they celebrated Agnihotras and other rites. (5.37.45-49).

The river Sarasvati_ saw, O king, those R.s.is filled with despair and anxiety for want of a commodious ti_rtha wherein to perform their rites.

Accordingly that best of streams came there, having made sufficient accommodation on her bank for those R.s.is, out of compassion for them, O Janamejaya.

Having thus, O king, changed her course for their sake, the Sarasvati_, the best of rivers, once more flowed in a westerly direction, to make the arrival of the R.s.is there successful. O king, the great river accomplished there this wonderful feat. (5.37.50-53)

Thus those reservoirs of water, O king, were formed in Naimisha. There, at Kuruks.etra, O Kuru chief, do you celebrate grand sacrifices and rites. Beholding those innumerable reservoirs of water and seeing that best of rivers change her course, the high-souled Rama was filled with wonder. (5.37.54)…

Adored by those R.s.is, Vala, O king, left that foremost of all ti_rthas on the Sarasvati_ (viz., Sapta-Sarasvat). Numerous birds also lived there. And it abounded with Vadari, Vibhitaka, Kakkola, Palas'a, Karira, Pilu, and various other kinds of trees that grow on the banks of the Sarasvati_ (5.37.59).

And it was adorned with forests of Karushakas, Vilwas, and Amratakas and Atimuktas and Kas'andas and Parijatas. (5.37.60).

It abounded with forests of plantains pleasant to view and most charming. And it was haunted by various ascetics…And it was the favouritge abode of men shorn of malice and devoted to righteousness. Baladeva, having the plough for hs weapon, arrived at that ti_rtha, called the Sapta-Sarasvat, where the great ascetic Mankanaka had his penances successfully practiced. (5.37.62-63).

Janamejaya said: "Why was that ti_rtha called Sapta-Sarasvat?… (5.38.1)…

Vais'ampa_yana said: "O king, the seven Sarasvati_s cover this Universe. Wherever the Sarasvati_ was called by the energetic r.s.is, there she did go. (5.38.2)

These are the seven forms of the Sarasvati_, viz., Suprabha, Ka_n~cana_ks.i, Vis'a_la, Manorama, Oghavati, Suren.u, and Vimalodaka. (5.38.4)…[Legends

of each of these seven forms follow…Sarasvati_ made her appearance at Pus.kara and was called Suprabha (5.38.13)…Munis assembled at Naimis.a and Sarasvati_ appeared there, she was called Ka_n~cana_ks.i (5.38.19)…Sarasvati_ came to the sacrifice of king Gaya, at Gaya, where she was called Vis'a_la at Gaya (5.38.21)…The quick-coursing Sarasvati_ river originates from the side of Himavat. Ouddalaka had performed a sacrifice in north Kos'ala where she was called Manorama (5.38.25)…the great Kuru sacrificed at Kuruks.etra where the highly sacred Sarasvati_ came assisted by Vasis.t.ha, there she passed by the name of Oghavati (5.38.27)…Daks.a celebrated a sacrifice at the source of Ganga, where Sarasvati_ appeared under the name of the quick-coursing Suren.u (5.38.28).…Brahman was sacrificing in the sacred forest of the Himavat and Sarasvati_ came there (5.38.29)...

All these seven streams then came and joined together in that ti_rtha where Baladeva came. And because the seven joined together at that spot, therefore is that ti_rtha known on earth by the name of Sapta-Sarasvati_ (5.38.30)…[The legend of Mankanaka, who was begotten by the god of wind upon Sukanya, follows.]…
Vais'ampa_yana said: "Baladeva then went to the ti_rtha known by the name of Us'anas. It is also called Kapa_lamochana. Formerly, Rama (the son of Das'aratha) slew a ra_ks.asa and thre his head to a great distance. That head, O king, of Mahodara, fell upon the thigh of a great sage and stuck to it. Bathing in this ti_rtha, the great R.s.i was freed from that burden. The great S'ukra had practiced his ascetic penances there. (5.39.4-5).

It was there that the science of politics and morals, that passes by S'ukra's name, was revealed to him. While living there, S'ukra meditated upon the war of the Daityas and the Da_navas. (5.39.6)…[The legend of Kapa_lamocana follows recounting how Rama had killed a ra_ks.asa Mahodara, at janastha_na in Dan.d.aka].

…Baladeva then went to the hermitage of Rus'an:gu. (5.39.23).

There, O Bharata, Ars.t.is'ena had in days of yore practiced austerest of penances. There the great (ks.atriya) muni Vis'va_mitra became a Brahman.a. (5.39.24)…

(R.s.i Rus'an:gu said to all his sons): "He, that would renounce his body on the northern bank of the Sarasvati_ containing profuse water, reciting mentally sacred mantras, would never again be visited by death.' (5.39.32)…

…Baladeva then proceeded to that ti_rtha where the worshipful Brahma had created the mountains called Lokaloka, and where that best of R.s.is, Ars.t.is'ena, of rigid vows, had by hard penances acquired the dignity of Brahman.hood, and where the royal saint Sindhudvipa, and the great ascetic Devapi, and the worshipful and illustrious Vis'va_mitra of hard penances and fierce energy, had all acquired a similar dignity. (5.39.34-35). [The legends of the Krita age, of Aris.t.as'ena, Sindhudvi_pa, Devapi, Gadhi Kaus'ika, a ks.atriya (whose son was Vis'va_mitra), and Vis'va_mitra's encounter with Vasis.t.ha…Vasis.t.ha commanded his own sacrificial cow, saying: 'Create a number of terrible S'avaras'. (5.40.20)… [By penance, Vis'va_mitra becomes a Brahman.a]…

…Rama proceeded to the hermitage of Vaka, which was not very far from where he was, the hermitage in which, as heard by us, Dalvya-vaka had practiced the hardest of penances. (5.40.32). [The legend of Dalvya-vaka who poured the kingdom of Dhritara_s.t.ra, the son of Vicitravi_rya…the kingdom of that monarch began to dwindle as a large forest gradually disappears when men cut it down with the axe…]

…Rama then proceeded, O king, to the ti_rtha called Yayata. (5.41.30). [Yayati, the son of Nahus.a, at whose sacrifice, the Sarasvati_ produced milk and clarified butter (5.41.31)]…

That foremost of rivers gave each of them (Yaya_ti and other Bra_hman.as) that were invited to the sacrifice, where he was, houses and beds and food of the six different tastes and various other things… (5.41.34)…

…Baladeva…then proceeded to that ti_rtha of fierce current called Vasis.t.hapavaha. (5.41.37).
Janamejaya said: [The legend of the enmity between Vis'va_mitra and Vasis.t.ha].

"…The hermitage of Vasis.t.ha was in the ti_rtha called Stha_n.u on the eastern bank of the Sarasvati_. On the opposite bank was the hermitage of the intelligent Vis'va_mitra. (5.42.4).

…In that Stha_n.uti_rtha, the celestials had, formerly, O king, appointed Skanda, that destroyer of the enemies of the celestials, as the generalissimo of their army.. (5.42.7). [The legend of how Vis'va_mitra asks Sarasvati_ to bring, by force of her current, the ascetic Vasis.t.ha so that Vis'va_mitra may kill him…Sarasvati_ bring Vasis.t.ha and before Vis'va_mitra could slaughter Vasis.t.ha, carries the latter away to her eastern bank once more. Vis'va_mitra gets enraged by this deception of Sarasvati_ and addressed Sarasvati_ saying:]

'Since, O best of rivers, thou has gone away and deceived me, let thy current be changed into blood like of ra_ks.asas'. (5.42.37).

Thus cursed by the intelligent Vis'va_mitra, Sarasvati_ flowed for a whole year, bearing blood mixed with water. (5.42.38)...
The sequel to Vasis.t.ha_pava_ha episode is recounted in Skanda Pura_n.a (Na_gara Ka_n.d.a 173. 9-10). Sarasvati_ flows red with blood. She complains to Vasis.t.ha about Vis'va_mitra's curse. Vasis.t.ha travels from Arbuda to Plaks.a and meditates repeating the Varun.a mantra while fixing his gaze on the ground:

evamuktva_ sa viprars.iravati_ryam dhara_tale
gatah plaks.atarum yasma_davati_rn.a_ sarasvati_
sama_dhim tatra sandha_ya nivis.t.o dharan.i_tale
sambhramam paramam gatva_ vis'va_mitrasyacopari

The earth is pierced at two points: from one point gushes forth Sarasvati_ with water purified of the blood and from the other point is born the Sa_mbhramati_ named after R.s.i's sambhrama or agitation against Vis'va_mitra:

(Skanda 173. 12, 14)
randhradvayena viprendra_ locana_bhya_m niri_ks.an.a_t
ekasya salilam ks.ipram yatra ja_ta_ sarasvati_
dviti_yastu prava_ho yah sambhrama_ttasya nirgatah
sa_ ca sa_mbhramati_na_ma nadi_ ja_ta_ dhara_tale

Bharadwaj notes the concordance of the term, 'sa_mbhramati_' with the Somb nadi_, which is identified with the Rgvedic As'manvati_-Dr.s.advati_. (opcit., p. 30). On one side is the Somb nadi_ and on the other side of the Siwalik ridge are two streams called Ashmi and Assan which join Giri River which ultimately flows into the Yamuna_. (Dr. V.M.Puri has shown that Giri was

once a tributary of Sarasvati_ river, together with Tons (or Tamasa) before these two tributaries were captured by Yamuna_ at Paonta Saheb). The Ashmi and Assan may be a reference to As'manvati_ river which is mentioned in the R.gveda.

Vais'ampa_yana said: [R.s.is came on pilgrimage and saw Sarasvati_'s plight.]

'All of us shall release Sarasvati_ from her curse'. (5.43.13).

…all those Brahman.as emancipated that foremost of rivers, viz., the divine Sarasvati_ (5.43.14)…

Understanding the wishes of those great R.s.is, that best of rivers caused her body, O foremost of men, to assume a new form called Arun.a. (5.43.28).
Bathing in that new river the ra_ks.asas renounced their bodies and went to heaven. (5.43.29)…[The legend of Indra affected with the sin of Brahman.icide. The head of Namuci also dropped into that stream, Arun.a (5.43.46).]

..Vais'ampa_yana said: ..Baladeva..then proceeded to the great ti_rtha of Soma. (5.43.46).

There, formerly Soma himself, O emperor, had celebrated the Ra_jasu_ya sacrifice. The great Atri, that foremost of Brahman.as , endued with great intelligence, became the sacrificial priest in that grand sacrifice. Upon the termination of that sacrifice, a great battle took place between the gods and the Da_navas, the Daityas and the ra_ks.asas. That fierce battle known after the name of the Asura Taraka. In that battle Skanda killed Taraka. (5.43.47-48).

…In that ti_rtha is a huge as'vattha tree. Under its shade, Ka_rtikeya, otherwise called Kumara, always lives in person. (5.43.49). [The legend of investiture of Kumara by the gods follows.]

The site selected (in Himavat, by the gods, to celebrate Kumara's victory and investing him with the dignity of generalissimo) was the bank of the sacred and divine Sarasvati_, that foremost of rivers, taking her rise from Himavat, which is celebrated over the three worlds by the name of Samantapan~caka. (5.44.50).

…Listen now to the history of the sanctity of that best of ti_rthas, on the Sarasvati_. That best of ti_rthas, O king, after the enemies of the celestials had been killed, became a second heaven…That other ti_rtha, O best of Bharatas, where in days of yore, Varun.a, the lord of waters had been installed by the celestials, is known by the name of Taijisa. (5.46.99-103)…[The legend of Satya Yuga when Varun.a was installed at the Taijisa ti_rtha follows...Installed by the celestials, the illustrious Varun.a began to duly protect seas and lakes and rivers and others reservoirs of water as Indra protects the gods (5.47.11)]…

…Baladeva…then proceeded to Agni ti_rtha, where the eater of the clarified butter (Agni), disappearing from the view, became concealed within the entrails of the S'ami wood. (5.47.12)…

…Valarama…then went to Brahmayoni where the worshipful Grandsire of all the worlds had created the world. (5.47.21).

…Baladeva then proceeded to the ti_rtha called Kauvera, where the powerful Ailavila, having practiced severe austerities, became the king of riches. (5.47.23)…

Rama saw at that spot the excellent woods of Kuvera.In days of yore, the great Kuvera the king of the Yaks.as, having practiced the severest austerities there, obtained many boons. (5.47.25). [Son called Nalakuvara…Maruts installing Kuvera as king of Yaks.as]…

…Baladeva then went to another ti_rtha…Abounding in various creatures, that ti_rtha is known by the name of Vadarapachana. There the fruits of every season are always available and flowers and fruits of every kind are always abundant. (5.42.29).

…Vadarapachana where dwell many ascetics and siddhas. There the daughter of Bharadwaja peerless on earth for beauty, named S'ruvavati (whose mother was Apsara Ghr.taci_), practiced severe austerities. She was a maiden who led the lift of a Brahmacarin.i. (5.48.1-2)… in that ti_rtha, Vadarapachana, the seven r.s.is had once left Arundhati while they went to Himavat (5.48.32)…

…Baladeva then went…to the ti_rtha of S'akra (called Indra ti_rtha). (5.48.65)…

He then went to that auspicious and foremost of ti_rthas called after the name of Rama of Bhr.gu's race, where he performed a va_japeya yajn~a and as'vamedha with preceptor Kas'yapa (5.49.6-8)…

Baladeva…proceeded to ti_rtha called Yamuna. (5.49.11)…and then to the ti_rtha called Aditya. (5.49.17)…

…in that auspicious and sacred ti_rtha of the Sarasvati_, Vis.n.u himself, having in days of yore, slain the asuras, Madhu and Kaitabha, had, O chief ot the Bharatas, performed his ablutions. The island-born Vya_sa also, O Bharata, having bathed in that ti_rtha, acquired great yoga powers and siddhi. Having bathed in that very ti_rtha with a concentrated mind, the R.s.i Asitadevala also obtained great yoga powers. (5.49.18-24). [The legend of r.s.is, Asitadevala and Jaigis'avya].

Baladeva then went to the ti_rtha of Soma (5.50.67) and to the ti_rtha of the muni named Sarasvat. There during a drought exceeding over twelve years, the sage Sarasvat, formerly taught the Vedas unto many best of Brahman.as (5.51.1). [The legend of Sarasvatt follows].

...sage Dadhica...S'akra was possessed by fear of the ascetic austerities of Dadhica… Apsara Alamvus.a was deputed…Seeing that beautiful damsel the seminal fluid of that ascetic came out. Having fallen into the Sarasvati_, the latter preserved it with care. Indeed, O foremost of men, the River, seeing that seed, held it in her womb. In time the seed developed into a foetus and the great river kept it so that it might have life and grow into a child…Sarasvati_ brought the child to the R.s.i...Pleased with the River, the great ascetic, Dadhica then gave a boon to her, saying: 'The Vis'vedevas, the R.s.is, and all the clans of the Gandharvas, and the Apsaras, will henceforth, O blessed one, derive great happiness when oblations of your water are presented to them!"(5.51.1-17).

Having said to that great river, the sage, pleased and filled with joy, then praised in these words. Hear them duly, O king! (5.51.18).

'Thou has sprung, O highly blessed one, from the lake of Brahman in days of old. All ascetics know three, O best of rivers.

Highly beautiful, thou hast done me great good! This thy great child, O fair, river, will be known by the name of Sarasvat.

During a drought extending over twelve years, this Sarasvat, will teach the Vedas to many best Brahman.as.

O blessed Sarasvati_, through my grace, thou shalt always become the best of all sacred rivers!' (5.51.19-23). [The legend of Dadhica's bones used to kill the enemies…Sarasvati_ offered her large fishes in the river to the sage Sarasvati, who taught the Vedas…].

[Then Baladeva goes to a ti_rtha where lived formerly an old virgin lady, daughter of Kuni-Garga, the lady had adored the Pitr.s and gods inj the solitary forest.] (5.51.51 to 5.52.1-7). Then having come out of Samantapan~caka, Baladeva enquired of the R.s.is about the results of the battle at Kuruks.etra (5.52.25)]. This is the same area called Kuruks.etra (the field of Kuru). (5.53.2). [The legend of the great Kuru cultivating the field].

The space between the Tarantuka and the Arantuka and the lakes of Rama and Camacakra is known as Kuruks.etra. Samantapan~caka is called the northern (sacrificial) altar of Brahman, the Lord of all creatures. (5.53.25).

Baladeva then visited the hermitage of the daughter of S'a_n.d.ilya. (5.54.7).

Bidding a farewell to the R.is.is, Baladeva performed all the rites and ceremonies of the evening on the side of Himavat and then began to ascend the mountain. (5.54.9).

The powerful Valarama having the emblem of the palmyra on his banner had not ascended far when he saw a sacred and goodly ti_rtha and was stricken with wonder at th sight.

Seeing the glory of the Sarasvati_ as also the ti_rtha called Plaks.aprasaravan.a, Vala next reached another excellent and foremost of ti_rthas called Ka_raparvan.

Having made many presents there, the powerful Baladeva, bathed in the cool, clear, sacred, and sin-cleansing water (of that ti_rtha).

Passing one night there with the ascetics and the Brahman.as, Rama then went to the sacred hermitage of the Mitravarun.a.

From Karapavana he proceeded to that spot on the Yamuna where formerly Indra and Agni and Aryaman had obtained great felicity. (5.54.10-14). [Then Balarama listens from Narada the state of the battle: already Bhishma and Dron.a and the lord of the Sindhus have died. Vikartana's son Karn.a also has been killed…Duryodhana has risen from the lake and come forward to fight Bhima…]

Balarama ordered his attendants saying: Return ye to Dwaraka! He then got down from the prince of mountains and that fair hermitage called Plaks.apras'ravan.a.

Having listened to the discourse of the sages about the great merits of ti_rthas, Rama sang this verse, in the midst of the Brahman.as.

'Where is such happiness as is obtainable by living by the Sarasvati? Where else such merits as those obtainable by living by the Sarasvati? Men have departed for heaven, having approached the Sarasvati! Sarasvati is the most sacred of all rivers.

Sarasvati_ always confers the greatest happiness on men! After approaching the Sarasvati_, men will not have to grieve for their sons either here or hereafter!

Repeatedly looking with joy at the Sarasvati_, that destroyer of foes then ascended an excellent car to which were yoked beautiful horses.

Journeying then on that highly fleet car Baladeva, that best of Yadu's race, desirous of seeing the approaching encounter of his two disciples, arrived on the field. (the battle with the maces between Duryodhana and Bhima).(5.54.35-40).

Sarasvati_ heritage is the very fabric of the cultural traditions of Bharat

It is important to note that the sacred lore of Sarasvati_ is emphatic and continuous in the civilization of Bha_rat and expresses itself in many forms: painting, sculpture, temple architecture, a_gamas, music, dance, drama and in fact, in all forms of arts and crafts, apart from the literary texts.

Sarasvati is the very personification of knowledge and is so celebrated in all forms of human expression and the historical tradition of Bharat.

The historical tradition of Bha_rat is dated to the Atharvaveda which defines itiha_sa. The banks of the River Sarasvati define a cluster of ashrama's and hermitages of r.s.is and munis who are adored in the cultural tradition of Bharat. The lineage of the r.s.is elaborated in this section should be seen in the context of the lives of these architects of the nation remembered and celebrated in the ancient 'history books' of Bharat, including the Great Epic, the Maha_bha_rata.

Maha_bha_rata refers to itself as an itiha_sa. (MBh. 1.1.19.54; 2.41; 60.23; 62.19). The epic has many legends which are also in the Bra_hman.as, for e.g.,: S'unahs'epa, Tris'iras, Cyavana-sukanya_, S'akuntala_. The legend of Naciketas noted in Kat.hopanis.ad also finds a place in the epic. Many forms of marriage as described in A_s'vala_yana Gr.hayasu_tra and Manusmr.ti are also note din the epic (MBh. 13.44.3-10; 13.19.2ff). The epic also refers to the A_ran.yakas (s'a_stra_n.i a_ran.yaka_ni ca) and kalpa su_tras (Mbh. 13.17.78; 9.38; 14.92).

The term, itiha_sa occurs in Atharva Veda [parya_ya su_ktas of the Vra_tya addressed to Praja_pati, who saw himself in gold (suvarn.ama_tmannapas'yat)]:

> **sa br.hati_m dis'amanuvyacalat**
> **tamitiha_sas'ca pura_n.am ca ga_tha_m.s'ca**
> **na_ra_s'am.si_s'ca_nuvyacalat**

itiha_sasya ca vai sa pura_n.asya ca ga_tha_na_m ca na_ra_s’am.si_na_m ca priyam dha_ma bhavati ya evam veda

AV 15.6.10 ff. He moved out toward the great quarter; afte rhim moved out both the itiha_sa (‘narrative’) and the pura_n.a (‘story of old’) and the ga_tha_s (‘songs’) and the na_ra_s’am.si_s (‘eulogies’). Verily both of the itiha_sa and of the pura_n.a and of the ga_tha_s an dof the na_ra_s’am.si_s doth he become the dear above who knows thus.

Commentators note that a legend relating to Vedic deities is known as itiha_sa in Vedic literature. [S’an:kara on Br.h. Up. 2.4.10: itiha_sam ityurvas’i_pururavasoh samva_da_dih: urvas’i_ ha_sara_h (S’B 11.5.12) itya_di bra_hman.ameva); Sa_yan.a in R.gveda bha_s.ya bhu_mika_: deva_sura_h samyakta_ a_san (Tait. Sam. 5.3.11.1) itya_daya itiha_sa_h]. Vedic geography is echoed in the names of vinas’ana, plaks.a-prasravan.a ka_rapacava (changed to ka_raparvan or ka_rapavana), kha_n.d.ava, kha_n.d.ava-prastha, tri-plaks.a (or plaks.a_vataran.a), naitandhava (or na_gadhanva_ or present naha_n), apart from kuru pan~ca_la and kuruks.etra.

(Ram Gopal, The Veda and Maha_bha_rata, in: *Golden Jubilee Volume*, ed. T.N. Dharmadhikari, Poona, Veda Sams’odhanamandala, 1981, pp. 232 – 240; A new interpretation of the Vedic word ma_nus.a in: *Journal of the Ganaganatha Jha Research Institute*, vol. XVII, Parts 3-4).

In section 4. of the introduction "Arrangement of the Rigveda" Macdonell says about book 9: 1) ...the hymns of Book ix were composed by authors of the same families as those of Books ii to vii, as is shown, for instance, by the appearance here of refrains peculiar to those families. Hence it is to be assumed that all the hymns to Soma PavamAna were removed from Books i-viii, which were the sphere of the hotr.reciting priest in order to form a single collection belonging to the sphere of the udga_tr. or chanting priest." 2)"The diction and recondite allusions in the hymns of this book suggest that they are later than those of the preceding books;"3)"but some of them [hymns of book 9] may be early, as accompanying the Soma ritual which goes back to the Indo-Iranian period." (MacDonell, A.A., *A Vedic Reader for Students*).

“The earliest brahmans were connected with the non-Aryan peoples, and were established among them when the Ailas entered. This is corroborated by the close connexion that existed between them and the Daityas, Da_navas and

asuras…The Da_nava S'ambara is represented as devoted to brahmans (MBh. Xiii,36). It is said that the Bha_rgavas were purohitas to Hiran.yakas'ipu (MBh. iii,102,8758)., the original Daitya monarch, and that 'Vasis.t.ha' was his hotr. (MBh xii,344,13209-10). Further, it is often declared that Indra incurred the sin of brahmanicide by killing Vr.tra and Namuci, so that the two famous Da_navas were brahmans…

"What the very early brahmans were is evidenced by what is said about their doings. They are sometimes connected with sacrifices, especially in late tales and late versions of older stories, but what is constantly associated with them is tapas, 'austerities'. That was their chief pursuit and main exercise, and its efficacy was in their belief to acquire superhuman powers which would enable them to dominate the natural and supernatural worlds: hence it is often alleged that by tapas they (and other men also) gained from the gods the boons they wanted, or that the gods were terrified and endeavoured to break their tapas. Their reputation rested on their claim to possess 'occult' faculties and powers and the popular belief that they possessed them. Thus it appears that the original brahmans were not so much priests as 'adepts' in matters supernatural, 'masters' of magico-religious force, wizards, medicine-men. Their reputation gave them very high rank, equal to that of their princes. They do not appear to have constituted a caste then. It is said brahmans were united (san:gata) with ks.atriyas originally (MBh i,75,3139)…and there was no difficulty in early times in ks.atriyas becoming brahmans.

"Thus it is intelligible that intermarriages took place between the brahmans and the early Aila royal family. (Bha_g. ix,18,5: Yaya_ti's marriage with S'ukra's daughter)…It is said that Puru_ravas obtained sacrificial fire from the Gandharvas, learnt the way of making fire from as'vattha firesticks and sacrificed therewith, and that out of that fire he himself constituted three separate fires. He and his successors therefore performed sacrifices of some kind, and appeared to have sacrificed for themselves, for nothing is said of any priests in connexion with them, except that in a few late brahmanical tales or additions brahmans are made their priests…Yaya_ti's eldest brother Yati becdame a muni…Cyavana's descendants (Bha_rgavas) became priests to the Haihayas, and, when they broke with the Haihayas, the A_treyas succeeded to their position. The Kas'yapas arose in Madhyades'a after the Haihaya devastations. ..

“Kan.va Kas’yapa was there in Dus.yanta’s time. In fact, in the Ganges-Jumna doab, the region specially occupied by the Ailas, it was not until Dus.yanta’s and Bharata’s period that any brahman became connected with them as priest. Those brahmans who associated with the Ailas thus became established and multiplied into the great brahman families, and the others disappeared or took lower rank, except the Vasis.t.has who maintained their high position in the powerful Ma_nva kingdom of Ayodhya_…Where the brahmans did claim some credit, as in the story of Ma_t.hava, king of Videgha (Videha), and his priest Gotama Ra_hugan.a (SB i,4,10-19: if Agni Vais’va_nara went b burning along the earth from the Sarasvati_ to Videha, Agni burnt over the Paurava territory (including N. Pan~ca_la) and the Ayodhya_ realm…it might mean that the reformed Brahmanism passed from the Bha_rata kingdom to Ayodhya_ and then to Videha), it does not refer to the Ailas, for Videha was a Ma_nva kingdom…

“The chronological list shows that the earliest really historical rishi-authors (of Rigvedic hymns) were Vis’va_mitra, his sons Madhucchandas, S’unahs’epa-Devara_ta, etc., and Jamadagni. With his time then we enter definitely upon the true Vedic age…The hymns therefore that are said to be the most ancient are ascribed to Ma_nvas and their rishis, and not to Ailas. Those Ma_nva kings all reigned at Ayodhya_ or in the Vais’a_li_ realm, that is, in the eastern region, except S’a_rya_ta who was in the west. No hymns are assigned to any one who lived in the north-west until S’ivi.. These facts supply ground for the declaration that the Vedas were first chanted in the eastern region (MBh v,107,3770)—not in the north-west…

“The next great stage in the composition of the hymns began with the above-mentioned development of Brahmanism in connexion with sacrifice after Bharata’s time…His territory included the tract between the rivers Dr.s.advati_ and Sarasvati_, and he sacrificed on the latter (MBh vii,6i,2384-5; xii,29,939-40), which was a large river then. That region probably had some sanctity before, for on the Sarasvati_ was Us’anas-S’ukra’s ti_rtha Kapa_lamocana (MBh iii,83,7005-7), and the river constituted the boundary between the Panjab and the Ganges-Jumna basin, whether it flowed into the Ra_jputana desert, or especially if the sea extended northwards into that desert then…

“This is supported by the general statement (ignoring special ma_ha_tmyas) that the most sacred region in the Kr.ta age was Naimis.a forest, in the Treta_ Pus.kara, in the Dva_para Kuruks.etra, and in the Kali age the Ganges. (MBh

iii,87,8301-3; Va_ P. 2,8-9). Naimis.a forest was on the River Gomati_ in the Ayodhya_ kingdom, thus the site of earliest sanctity in India is placed among the Ma_nvas in the eastern region. So the brahmans whom Puru_ravas came into special contact with were the rishis of Naimis.a as mentioned above. The Dva_para age began between Divoda_sa's and Suda_sa's times. Kuru reigned early in it, from him the region of the Sarasvati_ obtained the name Kuruks.etra, and so both became specially sacred in that age. The region was called Brahma_varta also (Manu ii, 17,19), though from what time is not clear…" (F.E. Pargiter, 1922, *Ancient Indian Historical Tradition*, London, pp. 306-314; repr. Delhi, Motilal Banarsidass, 1962).

The inference of Pargiter that the earliest Brahmans were connected with the non-Aryan peoples is contradicted by the fact that there are ninety five generations before the Bha_rata war. The Pura_n.as are emphatic that the Pu_rus were located in the Panjab region and a large number of Pu_ru kings are mentioned in the R.gveda. Even if a conservative period of 20 years is assigned to each generation of kings before the Bha_rata War, the Vedic age prior to 3102 BC should have covered a period of about 2,000 years.

The author of the original Maha_bha_rata (MBh.) is Kr.s.n.a Dvaipa_yana Vya_sa who had arranged the single Veda into four Vedas and taught them to Sumantu, Jaimini, Paila and Vais'ampa_yana. (MBh. 1.63.5; 69,89; references are to the Gi_ta_ Press Edition).

Veda Vya_sa, means, arranger and compiler of the Vedas. The MBh. is endowed with the import of the four Vedas:

> **tasya_khya_navaris.t.hasya vicitrapadaparvan.ah**
> **su_ks.ma_rthanya_yayuktasya veda_rthairbhu_si.tasya ca (MBh. 1.1.18)**
> **vedais'caturbhih samyukta_m vya_sasya_dbhutakarman.ah**
> **samhita_m s'rotumiccha_mah pun.ya_m pa_pabhaya_paha_m (MBh. 1.1.21)**

The son of Satyavati_ is said to have composed the itiha_sa after analyzing the eternal Veda with austerity and celibacy: tapasa_ brahmacaryen.a vyasya vedam sana_tanam; itiha_samimam cakre pun.yam satyavati_ sutah (Mbh. 1.1.54).

R.s.i a_s'rama on the banks of River Sarasvati

Many ashramas of the r.s.is listed in the chronology which follows are located in the Sarasvati River Basin.

Chronology of R.s.is
(After F.E. Pargiter, 1922, *Ancient Indian Historical Tradition*, London, pp. 190-192; 330-331; repr. Delhi, Motilal Banarsidass, 1962)
Vedic genealogies of r.s.is are found in the S'atapatha Bra_hman.a (10.6.5.9) and Br.hada_ran.yaka Upanis.ad (2.6; 4.6; 6.5).

S'a_n.d.ilya r.s.i performed severe penancfes to obtain the sight of goddess S'a_rada_. The sage went to Kr.s.nagan:ga_ (called at present Krishnanag situated above the village of Drang and called Suna-Drang). From this place, he climbed the mountain to the north and passed through the forests called Ran:gava_ti and Sostambhara. He arrived at Tejvana, the residence of Gautam on Kishanganga. S'arada_ma_ha_tmya notes that the sage reached the S'arada_vana (presently called Sardi) where the goddess revealed herself to him. The Pitr.s approached the sage and asked him to perform s'ra_ddhas. When he took the water from Maha_sindhu, half of the water transformed into honey and became the river called Madhumati_. Madhumati_ is a stream which joins Kishanganga at Sardi from the south. S'a_rada_stha_na is located at the junction of Madhumati_ and Kishanganga rivers, 2.5 miles north of a site named as S'irahs'ilakotta. Kalhan.a mentions S'arada_stha_na in connection with the S'irahs'ila castle. (Stein: Ra_jataran:gin.i_, p. 2556,. 2706). Alberuni writes about the S'a_rada_ ti_rtha: "In inner Kashmir about two or three days of journey from the capital in the direction towards the Bolar Mountain, there is a wooden idol called S'a_rada_ which is much respected and frequented by pilgrims." Abul Fazl also noties the shrine of S'a_rada_. A na_ga called S'a_rada_kun.d.a, some 4 miles north of the Dal Lake is frequented by pilgrims. (Ain-I-Akbari ii, p.366; Stein: Ra_jataran:gin.i_, p. 279; Sk. P. Na_gara 157.8) (cf. Savitri Saxena, 1995, *Geographical Survey of the Pura_n.as*, Delhi, Nag Publishers, pp.746-748).

Development of Indian Music, Calcutta, Firma KL Mukhopadhyay) notes the Vedic worship of this deity as one of a triad of goddesses, who are described by Sa_yan.a (commentator of R.gveda) as three blazing flames of agni. In course of time, Sarasvati_ became identified with fire as a means of communication with the gods. "In the mytho-historical literature, Devi_

Sarasvati_, the presiding deity of learning and all arts, was described as the tongue of the sacrificial fire (agni-jihva_sarasvati_)…The ancient authors of music conceived and deified the primal sound, Na_da, as a symbol of the goddess Sarasvati_." (Prajn~a_nanda, 1960, p.51). S'atapatha-Bra_hman.a (VII, 2.4.1.-7) associates the goddess with the Gandharvas, the celestial musicians (p. 56-57). The legend has it that the Gandharva, Vis'va_vasu stole the nectar Soma from Ga_yatri_ (also a hymn addressed to the Sun). Devas learnt of this theft of Soma and sent the maiden Va_k to rescue soma. Charmed by Va_k, the Gandharvas proposed to the Devas that soma could be the Devas provided Va_k is for Gandharvas. Having acquired Va_k, the Gandharvas became proficient in music. A musical instrument and a (palm-leaf) manuscript is associated as an emblem with Sarasvati_ from very ancient times. (Aitareya Bra_hman.a. cf. Macdonell and Keith, *Vedic Index*, II, p. 435).

Pura_n.as cherish her with names such as va_k, va_gdevi_, bha_rati_, s'a_rada_. Pura_n.as also connect Sarasvati_ with Brahma as the latter's daughter and as consort and with Vis.n.u as Pus.t.i (one who thrives). Jaina religious treatises make her the principal s'rutadevata_ and vidya_devi_. Vis.n.udharmottara describes her as four-armed, white-coloured, dressed in white garments and decked with many ornaments, holding in her four hands any four of the following: manuscript, white lotus, rosary, musical instrument, water-vessel.

The equation of Sarasvati_ with Va_k is explained further by S'atapatha Bra_hman.a (3.2.3.15): tasma_d atro ttara_ hi vva_g vadati kurupan~ca_latra_ vva_g dy es.a_. Va_k is seen to be residing in the midst of Kuru-Pan~ca_las; thus the river flowing in the Kuru-Pan~ca_la region is associated with Va_k. Since Va_k is connected with Soma (see Gandharva legend which follows), Sarasvati_ is also called am.s'umati_, full of the Soma. "Soma, frightened by Vr.tra, fled to the Am.s'umati_, flowing in the Kuruks.etra region. He settled there and gods, too, settled there along with him. They used soma, and thereby evolved soma-sacrifices." (Su_ryaka_nta, Sa_ras, Soma and Si_ra, *Annals of the Bhandarkar Oriental Research Institute*, Vol. XXXVIII, Poona, 1958, p. 115).

Gandharvas allowed Vis'va_vasu to steal soma; as a punishment, the gandharvas were deprived of soma. (B.R.Sharma, Some aspects of Vedic Gandharvas and Aprasses, *The Poona Orientalist*, Vol. XIII, No. 1 and 2,

Poona, 1948, p. 68). Yajus. 10.33-34 describe the origins of the legend of Gandharvas and soma.

...hehais.a_m kr.n.uhi bhojana_ni ye barhis.o nama uktim yajanti upaya_magr.hi_tosyas'vibhya_m tva__m sarasvatyai tvendra_ya tva_ sutra_mn.e

10.32 What then? As men whose fields are full of barley reap the ripe corn, removing it in order, so bring the food of these men, bring it hither, who pay the sacred grass their spoken homage. Take upon a base art thou. Thee for the As'vins. Thee for Sarasvati_, and thee for Indra, for the excellent protector. [He throws meal of badari_ or jujube fruit into the purified sura_ and draws a draught of the liquor in a vessel of vaikan:kata (flavourtia sapida) wood, with the text, taken, with a variation from RV. 10.131.2].

yuvam sura_mama_s'vina_ namuca_va_sure saca_
vipipa_na_ s'ubhaspati_ indram karmasva_vatam

10.33 you As'vins, lords of splendour, drank full draughts of grateful Soma juice, and aided Indra in his deeds with Namuci_ of Asura birth. [cf. RV 10.14; Namuci_, an asura, is a friend of Indra; he is said to have drunk up sura_ and soma, the manly strength of Indra. Indra complained to the As'vins and Sarasvati_ who gave Indra a thunderbolt in the shape of the water's foam with which he cut or tore off Namuci's head.

S'a_n:kha_yana Bra_hman.a (12.3) states that Gandharvas stole Indra's soma and concealed soma in the waters: gandharva_ ha va_ indrasya somam apsu pratya_yita_ gopa_yanti ta uha stri_ka_ma_s te ha_ su mana_m.si kurvate. In another interpretationl, the gandharvas may be seen to be guarding soma. On any account, the gods had to purchase soma from the gandharvas, referred to as soma kraya, the purchase of soma. This legend is elaborated in Aitareya Bra_hman.a and S'atapatha Bra_hman.a

Soma was stolen by the Gandharva Vis'va_vasu and guarded by the Gandharvas, Sva_n and Bhra_ji. Soma was purchased by Va_k from the gandharvas.

soma vai ra_ja_ gandharves.v a_si_t tam deva_s' ca r.s.ayas' ca bhyadhya_yan katham ayam asma_n soma ra_ja_ gacched iti sa _ va_g abravi_t stri_ka_ma_

vai gandharva_ mayai va striya_ bhu_taya_ pan.adhvam iti neti deva_ abruvan katham vayam tvad r.te sya_me ti sa_ bravi_t kri_n.i_tai va yarhi va_va vo maya_ rtho bhavita_ tarhy eva vo ham punar a_ganta smi_ ti tathe ti taya_ maha_nagnaya_ bhu_taya_ somam ra_ja_nam akri_n.am (Aitareya Bra_hman.a 1.27). Va_k is the progeny of Praja_pati (AB. 20).

The name of one of the two gandharvas, namely, sva_n, who guarded the stolen soma is significant. In Yas't 10.67, Mitra is stated to come, driving in a chariot, from the eastern continent Arezahi_ to the splendid continent of Xvaniratha. The last two lines of the verse are rendered by Gershevitch as: "(Mitra comes) equipped with prompt energy, Mazda-created fortune, and Ahura-created victoriousness". (I. Gershevitch, *The Avestan Hymn to Mithra*, Cambridge, 1959). The name of the continent, Xvaniratha, seems concordant with Sva_n, the gandharva who guarded the soma. The eastern continent, 'Arezahi_' may be a reference to Arachosia < haraquaiti < sarasvati_ region. Sarasvati_ is called 'ams'umati_', full of the soma: "…Soma, frightened by Vr.tra, fled to the Ams'umati_, flowing in the Kuruks.etra region. He settled there and gods, too, settled there along with him. They used soma, and thereby evolved Soma-sacrifices." (Su_ryakanta, Sa_ras, Soma and Si_ra_, *ABORI*, vol. XXXVIII, Poona, 1958, p. 115).

Soma was with the Gandharvas and the gods became anxious and worked out a plan to retrieve the soma. Va_k intervened and suggested that the Gandharvas were fond of women. Va_k offered to assume the form of a woman and approach the Gandharvas to purchase soma back from the latter. Gods were reluctant to let go of Va_k because without Va_k they could not sustain themselves. Va_k promised to return after purchasing soma.

S'atapatha Bra_hman.a (3.2.4.1-2) elaborates on the legend. Gods wanted to take soma from heaven and perform a sacrifice on the earth. Suparn.i_ and Kadru_ were created as illusions to get soma. Suparn.i_ and Kadru_ had a dispute and the latter defeated Suparn.i_. So, Suparn.i_ was entrusted with the task of bringing soma. Suparn.i_ transformed herself into metres; of these metres, ga_yatri_ the goddess of metres, assumed the form of a bird, flew to heaven and brought the soma. (**suparn.ya_ nirmita_ ga_yatri_ chandodevata_ paks.iru_pen.a**: Sa_yan.a on S'B. 3.2.4.2).

During her flight back from heaven, Ga_yatri_ encountered the Gandharva Vis’va_vasu who robbed her of the soma. Gods became anxious as Ga_yatri’s return from heaven with soma was being delayed and realized that the Gandharvas had stolen soma. (S’B 3.2.4.2). Then, they planned to send Va_k to the Gandharvas, who were fond of women, to retrieve soma for the gods. (S’B 3.2.4.3). In the encounter of Va_k with the Gandharvas, the latter demanded that the gods should offer Va_k in exchange for soma. The gods agreed to the demand with the condition that if Va_k wanted to return the Gandharvas should not force her to remain with them against her will (S’B 3.2.4.4). Both the gods and gandharvas began to woo Va_k; gandharvas recited the Veda (S’B 3.2.4.5); gods played on a lute to entice Va_k. Gods won and the gandharvas lost both the soma and Va_k. (S’B 3.2.4.6-7). Mantraru_pa_ va_k, deified speech becomes, in the Bra_hman.as, the goddess of speech. She is associated with Vis.n.u and described as his tongue or residing in his mouth. (Skanda. P. 7.33.96). In Va_yu Pura_n.a (1.23.34), Sarasvati_ is described as one with a loud roar, maha_na_da_.



Vais’ambhalya_, the mother who nourishes a civilization

Taittiri_ya Bra_hman.a describes Sarasvati_ as vais’ambhalya_ (2.5.8.6; Vais’ampa_lya_ in Ap'SS 4.14.4). It is possible that the name of the Chambal river (which becomes the Yamuna which pirated Sarasvati River from Paonta Saheb and brought the waters of Sarasvati to Ganga at Prayag) was derived from this name: vaizambha_lya.

Sa_yan.a explains the verse: vis’va_m praja_na_m bharan.am pos.an.am vis’ambhalam tatkartum ks.ama_ vis’ambhalya_ ta_dr.s’i_. Sarasvati_ is thus vais’ambhalya_ or one who brings up the whole people. This epithet is an apparent expansion of Sarasvati_ as a river nourishing the settlements of people with her waters and promoting agriculture and other livelihood

activities of the people, she was indeed the giver of food, va_jinni_vati_. Sarasvati_ is called satyava_k: pra te mahe sarasvati_ subhage va_jinni_vati_ satyava_ce bhare matim idam te havyam ghr.tavat sarasvati satyava_ce prabharema_ havi_m.si: (TB 2.5.4.6; S'ri_ Ma_dhava explains the dative form, sartyava_ce: anr.tava_kyarahita_yai; thus, Sarasvati_ as Va_k is all truth, free from falsehood; in RV 1.3.11, she is codayitri_ su_nr.ta_na_m, the impeller of pleasing and true speeches). The waters are medicinal for the world (vis'vabhes.aji_h: TB 2.5.8.6). Sarasvati_ is sumr.d.i_ka_ (Taittiri_ya A_ran.yaka 1.1.3, 21.3, 31.6, 4.42.1); this is explained as having good soil (sumr.d), that is, land having good (fertile) soil. Sarasvati_ is described as both the land and the water: sarasvati saroyuktabhu_miru_pa is.t.ake (TA 1.1.3).

Gopatha Bra_hman.a (2.20) states that worship of Sarasvati_ pleases Va_k, because Va_k is Sarasvati_: atha yat sarasvati_m yajati, va_g vai sarasvati_ va_cam eva tena pri_n.a_ti. The very institution of the yajn~a itself which is identified with the gods is also identified with Va_k (TB 1.3.4.5: atho praja_pata_v eva yajn~am pratis.t.ha_payati praja_patir hi va_k; TB 16.5.16: va_g vai sarasvati_ va_g vairu_pam vairu_pam eva smai taya_ yunakti; Sa_yan.a's commentary: va_k s'abda_tmika_ hi sarasvati_ vairu_pan~ ca va_ksamatutam; Sarasvati_ is speech in the form of sound (s'abda or dhvani); the word 'ru_pam' suggests a number of forms of speech; vairu_pam is the object denoted by speech). S'atapatha Bra_hman.a states that Sarasvati_ is speech and speech itself is sacrifice. (S'B 3.1.4.9,14). Sarasva_n is identified with mind and Sarasvati_ with Va_k. (sa_rasvatau tvo tsau pra_vata_m iti mano vai sarasva_n va_k sarasvaty etau: S'B 7.5.1.31; 11.2.4.9, 6.3). Sarasvati_ is pa_viravi_ (RV 2.1.11; AB 3.37); this is interpreted as s'odhayitri_ or as purifying; or, as sound created by a spear or lance (pavi_ra) or Indra's thunderbolt. [pa_viravi_ = a_yudhavati_]. Sarasvati_'s connection with the mind and the cow (beneficial yield) led her giving full inspiration (dhi_) to compose hymns, and, consequently, she became the goddess of wisdom. (J. Gonda, *Pu_s.an and Sarasvati_*, p. 10; Book Review, *JRAS*, 1986, no. 1, pp. 120-21). In the Brahma_n.d.a Pura_n.a (4.7.27), Sarasvati_ is described as one of the nine Ma_tr.kas accompanying Lalita_ in her fight with Bhan.d.a_sura.

An exposition of the creation of matter in the universe is presented in the S'atapatha Bra_hman.a (6.1.3.1-5): By penance Praja_pati sought to reproduce himself in a process called ks.aran.a vya_pa_ra Each ks.aran.a vya_pa_ra implied an aks.ara or syllable and the eight ks.aran.as yielded the eight syllable

of the ga_yatri_ metre. Waters were produced. Waters enqwuired: of what use the waters? Praja_pati said: you should be heated. The waters were heated and foam was produced out of them. Foam was heated and clay was produced. Clay was heated and sand was produced. So from sand the pebble was produced; from pebble, the stone; from stone, the metal ore; and, finally, gold was produced.

Ga_yatri_ is Praja_pati's ks.aran.a and vya_hr.tis are: bhu_h, bhuvah, svah. Praja_pati's control over Va_k makes him Il.aspati, Va_caspati and Brahman.aspati (Br.had Devata_, 3.71).

Swan is associated with Brahma_; Matsya Pura_n.a states that the image of Brahma_ should be made as seated, in kamala_sana, on a swan. The Pura_n.a also states that the image of Brahma_n.i_ should correspond to that of Brahma_ (brahmasadr.s'i_). (MP CCLXI.24-25). The image of Brahma_ should have a site for oblations of ghee and the four Vedas.; To his right should be image of Sarasvati_ and to his left, the image of Sa_vitri_. Thus, Sarasvati_ is to be depicted as hamsa_dhiru_d.ha_. (MP CCLXI.25). In Jainism, the peacock is the vehicle of some vidya_devi_s (Rohin.i_, Prajn~apti, Apraticakra) (BCBhattacharya, *The Jain Iconography*, Lahore, 1939, pp. 98, 166-169).



Gan:gaikon.d.a Col.apuram—Rajendra I, 1030 A.D., Sarasvati_ seated on a lotus Tanjavur, Col.a, 12th cent. A.D., Brihadi_s'vara temple.



Skanda Pura_n.a has a legend (Skanda 6.46.16-19): King Ambuvi_ci had a great respect

for Sarasvati_. Taking the clay out of the river Sarasvati_, he made an earthen pratima_ (image) of Sarasvati_. The image has four hands carrying a lotus, a rosary, a water-vessel and a manuscript. Va_mana Pura_n.a recounts that Sarasvati_ was installed in the form of a lin:ga by S'iva himself at Stha_n.uti_rtha (Tha_nesar) (VP 11.4). In Basara (Vya_sapura) on the banks of Godavari (Adilabad District), the temple of Sarasvati_ has a sthalapura_n.am which states that Vya_sa took three mus.t.is of sand from the river and installed the image of Sarasvati_. Thus the association of Sarasvati_ as goddess with the Sarasvati_ as river is continued, through the ages, in the iconographic tradition of Indian civilization and culture. A temple for Sarasvati_ dated to ca. 1300 AD is at Kuthanur, near Swa_mimalai, Tamil Nadu, on the banks of River Cauveri.

Sarasvati_ Devi, Kuthanur, Tamil Nadu, on the baniks of River Cauvery, not far from the temple of E_raka Subrahman.ya (Ka_rttikeya) at Swa_mimalai.

Skanda Pura_n.a defines the course of the Sarasvati_ river (Skanda 1.ii.2.32; 1.iii.2.9; 6.98; 1.iii.12.4; ii.4.4.24; 2.7.4.15; 2.9.14.6; 3.ii.25.10; 5.i.57.31; 5.iii.3.10; 5.iii.9.47; 7.i.33.40-41; 7.i.35.25-27; 7.i.35.29-51; 7.i.36.52): "Sarasvati_ issuing from the waterpot of Brahma_, started on its downward course from Plaksha, on the Himavanta, and passing through Keda_ra, form where it turned westward (pas'cioma_bhimukhi_) concealed underground. Beyond Pa_pabhu_mi, she reached at Gandharvaku_pa and thence followed a westward course. Passing through Bhu_tis'vara and Rudrakot.i, Sarasvati reached S'ri_kan.t.ha des'a. Flowing, thence, through Kuruks.etra, Vira_t.anagara, Gopa_yanagiri (near Vira_t.anagara) and Deviks.etra, she reached Pas'cima des'a and again passing through Kharjuri_vana, under the name of Nanda_, as well as Ma_rkan.d.a_s'rama, Arbuda_ran.ya, Vat.avana, Vans'astamba, Ka_kati_rtha, Dha_res'vara, Pun.d.ari_ka, Ma_tr. Ti_rtha, Anaraka, San:games'vara, Kot.i_s'vara and Siddhes'vara, she ultimately joined the Pas'cima Sa_gara...It is also stated to be flowing in the Dharma_ran.ya, a sacred region placed to the east of Mahi_sa_gara. It was called Pra_chi_ Sarasvati_, Sa_vitri_ and Vedama_ta_, the names suggestive of its important contribution to Vedic culture, the development of which is intimately associated with the 'nadi_tama_' of the R.gveda. Thus Sarasvati_, the incarnation of Brahma_ (Bra_hmi_ mu_rtih) was reputed for its sanctity. Skanda also places many S'iva ks.etras along its course." (ABL Awasthi, *Studies in Skanda Purana*, pp. 153-54).

Brahma_n.d.a Pura_n.a lists sixteen rivers, all of which were married to Agni, that is, a reference to the settlers on these river banks who kindled the sacrificial fires (BP 2.12.13-16): ka_veri_, kr.s.n.aven.a_, narmada_, yamuna_, goda_vari_, candrabha_ga_, ira_vati_, vipa_s'a_, kaus'iki_, s'atadru, sarayu_, si_ta_, sarasvati_, hra_dini_ and pa_vani_. The sanctity of the rivers was thus linked to the sacrificial fires sustained on the banks of these rivers. Bha_gavata Pura_n.a (3.21.6; 22.27) recounts the legend of Kr.s.n.a who practiced penance under an as'vattha tree on the banks of the Sarasvati_ and the legend of Kardama, a sage who lived on the banks of the Sarasvati_ and practiced hard penance for ten thousand years. Brahma_ together with Mari_ci and other sages visited the a_s'ramam of Kardama. Sarasvati_ river had completely encircled this a_s'ramam. (Bha_gavata Pura_n.a 3.24.9).

Va_mana Pura_n.a states that Sarasvati_ was brought to Pus.kara by Pita_maha and to Kuruks.etra by Ma_rkan.d.eya. (VP XXXVII.16-23). The Pura_n.a also notes that Sarasvati_ river (called a great river, maha_nadi_: VP XXXVII.31, XL.8; Bha_gavata Pura_n.a V.19.18) alone, irrespective of seasons, never ceases to flow: vars.a_ka_labaha_h sarvam varjayitva_ sarasvati_ (VP XXXIV.8). Sarasvati_ is called Brahmaputri_ (Hemacandra, *Abhida_nacinta_man.i,* 4.151). Bha_gavata Pura_n.a calls her brahmanadi_ (BP IX.16.23) where the sage Paras'ura_ma took his avabhr.ta bath. The naming of a river emanating from Ma_nasarovar, Mt. Kailas as Brahmaputra is significant. The eastern-flowing river is a male river. The western-flowing Sarasvati_ which also emanated from the Ma_nasarovar, Mt. Kailas and flowed westward was named a female river. It is noted from satellite images of palaeo-channels of NW India, that S'utudri_ emanated from Ma_nasarovar and joined Sarasvati_ at Shatra_na, Punjab.

Sarasvati_ is said to start from Pus.kara lake after it disappeared at Vinas'ana. (Padma Pura_n.a Sr.s.t.i 7/3, 18/48, 137, 148, 181, 203, 218-219, 232). The fiver currents of Sarasvati_ here are called Pan~ca Srota_ Sarasvati_. (Bha_gavata Pura_n.a Ma_. 3/16). The Maha_bha_rata links Pus.kara with Prabha_sa and Naimis.a (MBh. Anu. 25/9). In Maha_bha_rata (MBh. Vana 86/20-21), the sage Dhaumya notes that Prabha_sa is a sacred place together with Camasobheda and Pin.d.a_raka. After disappearing in Vinas'ana, the Sarasvati_ river is stated to have reappeared at Camasobheda in Prabha_sa. Skanda Pura_n.a describes the river as Pan`casrota_ at Prabha_sa. (Skanda Prabha_sa 202/7). Lopamudra_ met and married Agastya at Prabha_sa on the seashore. It was here that the Ya_davas got drunk, fought among themselves

and got annihilated. The place where Kr.s.n.a gave up his mortal body is known as Dehotsarga, near Prabha_sa.

Sarasvati_ is the first creation among rivers and joins the ocean, according to the Great Epic:

> **es.a_ sarasvati_ pun.ya_ nadi_na_muttama_ nadi_**
> **prathama_ sarvasarita_m nadi_ sa_garaga_mini_ (MBh. Anus'a_sana 134.15)**

Sr.s.t.ikhan.d.a of Padma Pura_n.a relates the details of the all-consuming fire, vad.ava_gni. Aurva was a saint in the line of Bhr.gu who were the gurus of the Hehaya kings, exemplified by King Kr.tavi_rya. The sons of Kr.tavi_rya quarreled with the Bha_rgavas who were frightened and his in mountain-caves. Among those who so fled was A_rus.i_, wife of Cyavana. Her son was Aurva who was born with fiery radiance and made the Ks.atriyas blind. Aurva's fire of his penance took the shape of a horse-head and was forced down into the bottom of the sea. This fire is called Vad.ava_gni (A_diparva, Maha_bha_rata), the flames of Aurva, the Bha_rgava. Sarasvati_ is said to have carried this fire or Agni to the ocean at the request of Indra and also Brahma_: "O Devi_ Sarasvati_, you should deposit this Agni in the western ocean." So, Sarasvati_ became a river. Gan:ga_ followed Sarasvati_ and told the latter that Gan:ga_ would see her flowing northwards when she reached the eastern region surrounded by Devas. Sarasvati_ told her companions Gan:ga_, Yamuna_, Manorama_, Ga_yatri_ and Sa_vitri_ not to follow her. Thereafter, Sarasvati_ appeared in the a_s'rama of Uttan:ka, under the Plaks.a tree. Plak.sa carried Sarasvati_ just as S'iva carried Gan:ga_. S'iva gave the vad.ava_gni in a pot to Sarasvati_ who flowed towards the north and came to Pus.Karin.i_ to redeem the sins of people. From Pus.kara, Sarasvati_ flowed westwards reaching a garden of date trees, where she is known by the name of Nanda_. Another legend is that Nanda_ was a cow who would redeem King Prabhan~jana who had committed the sin of killing a deer. After flowing south for some distance from the garden of date trees, Sarasvati_ or Nanda_ again flowed northwards before reaching the ocean to deposit the pot containing Vad.ava_gni.

Skanda Pura_n.a emphatically adds that the Sarasvati_ river carries the Vad.ava_nala fire to the ocean:

> **sama_hu_ya tato devi_m sva_m suta_m padmasambhavah**

uva_ca putri gaccha tvam gr.hi_tva_gnim mahodadhim (Skanda Pura_n.a, Prabha_sa Ka_n.d.a 17.53, Venkateshwar Press edn.)

Padma Pura_n.a (S’r.s.t.i kha_n.d.a 18.198) states that the Sarasvati_ river vanished underground because she was made to carry the Vad.ava_nala fire. The reference is apparently to some large-scale tectonic disturbance which resulted in river piracy and river migrations involving the tributaries of the Sarasvati_ river. An intimation of this possible tectonic event is related in a legend in the Great Epic. Devas led by Brahma brought Ka_rttikeya to the Sarasvati_ river and made him the Commander of their army. With the s’akti given him by Agni, Ka_rttikeya broke asunder the kraun~ca mountain which sheltered the daitya Ba_n.a, son of Bali, who tormented the devas. That the kraun~ca mountain near Sarasvati_was rent asunder by fire is a significant reference to the tectonics of the Himalayan ranges and the foothills of the Siwalik mountain ranges.

Ocean and the submarine fire in the R.gveda

There is a reference to the submarine fire of the ocean in the invocation to agni or aus.asa agni:

त्रीणि जाना परि भूषन्त्य् अस्य समुद्र एकं दिव्य् एकम् अप्सु ।

पूर्वाम् अनु प्र दिशम् पार्थिवानाम् ऋतून् प्रशासद् वि दधाव् अनुष्ठु ॥

1.095.03 They contemplate three places of his birth; one in the ocean, one in the heaven, one in the firmament; and, dividing the seasons of the year for the benefit of earthly creatures, he formed, in regular succession, the eastern quarter. [This is an allegory of three births of Agni. Sa_yan.a notes: samudrebdhau vad.ava_nalaru_pen.a]. In RV 2.35.5, u_rva is also explained as submarine fire, samudramadhye vartama_nam vad.ava_nalam.

The vad.ava_nala fire was created by R.s.i Pippala_da to destroy the devas who had used the bones of his father Dadhi_ci to manufacture weapons to kill the asuras. (Skanda Prabha_sa, ch. 32). “Emerging from Plaks.a on the Himalaya, Sarasvati_ is obstructed on its way by a mountain wanting to marry her forcibly. Under the pretext of taking bath before the ceremony Sarasvati_ entrusts the fire to the mountain which is immediately burnt down by it. (Skanda 33.89). This is said to have happened in the Ca_ks.us.a Manvantara.

(Skanda 35.34). Again in the Vaivasvata Manvantara the same fire is born as Aurva_nala to a woman belonging to the tribe of the Bhr.gus who were attacked an dplundered by Ks.atriyas. The woman was pregnant and escaped concealing the foetus in her thigh (u_ru) which gave the name Aurva_nala to the fire that started consuming the earth immediately on its emergence. (Skanda 35.6). According to another version the woman gave birth to R.s.i Aurva who created the fire which was named after him. The fire created for destruction of Haihaya Ks.atriyas who had indulged in large-scale slaughter of the Bhr.gus was however confined to the ocean by Sarasvati_. (Skanda 34.36). Sarasvati_ is said to have conveyed Aurva_nala in a golden pitcher and taking its rise at Pippala_da_s'rama in the Himalayas it flowed westwqard reaching Keda_ra where it pierced the earth's crust to go underground burning with the fire in her hands. (Skanda 35.21-26). It broke forth again at Bhu_ti_s'vara after passing the evil region and then flowed towards Prabha_sa passing through S'ri_kan.t.hades'a, Kuruks.etra, Vira_t.anagara (near Jaipur), Gopa_yanagari, Kharju_rivana, Ma_rkan.d.a_s'rama and Arbuda_ran.ya. (Skanda 35.30-41). The Skanda Pura_n.a predicts the birth of another Vad.ava_nala at the end of the current Manvantara (Skanda 35.14)." (Bharadwaj, O.P., 1991, *Ancient Kuruks.etra*, Harman Publishing House, New Delhi: p.29).

> **eamukta_ tada_ tena Brahman.a_ ca sarasvati_**
> **hmavantam girim pra_pya pippala_da_s'rama_ttada_**
> **tsma_tstha_na_ttato devi_ prati_cyabhimukham yayau**
> **atardha_nena sa_ pra_pta_ keda_ram himamadhyagam**
> **ttsampla_vyagireh s'r.n:gam keda_rasya purah sthita_**
> **tna_gnina_ karasthena dahyama_na sarasvati_**
> **bu_mi vida_ryam tasya_dhah pravis.t.a_ gajaga_mini_**
> **tdantardha_nama_rgen.a pravr.tta_ pas'cima_ mukhi_**
> (Skanda Pura_n.a 1.35.21 and 24-26)

This is an extraordinary literary account from an ancien text which links up the the legend of the deluge which explains the Manvantaras in Hindu concept of time and the legend of the Sarasvati_ river and her courses while the practice of performing agnis.t.oma continued on the banks of the river.

Skanda Pura_n.a relates the legend about the ocean lying on the earth possessed of latent fire, vad.ava_gni. To push down this latent fire into Pa_ta_la loka and to bring good to the gods, God Vis.n.u requested Sarasvati_ to descend on the earth. Vis.n.u also implored Brahma_ to bid his daughter Sarasvati_ to perform this taSkanda Brahma_ asked Sarasvati_ to descend on

the earth to take the vad.va_gni to pa_ta_la loka. Sarasvati_, the goddess, turned herself into a river, got down on the Hima_layas and passing through Plaks.a entered the plains of the earth. (Skanda 7.33.13-15; 40-41).

The legend is a remarkable explanation of a geological phenomenon; Sarasvati bring the vad.ava_gni (the latent fire) to the bottom of the Pa_ta_la loka; the fire-worship along the banks of the Sarasvati run, along her entire course, from the mountains to the ocean, the pa_ta_la. Matsya Pura_n.a adds that the original source of the Sarasvati_ was the lake of snakes (sarpa_n.a_m tatsarah) on the Hemaku_t.a. The lake was the source of Sarasvati_ and Jyotimati_. The rivers ended up in the western and eastern seas. (MP CXXI. 64-65).

Skanda Pura_n.a also recounts the legend of the cows and Sarasvati_ in the Vad.ava_nala episode (Skanda 7.32):

> **dadhi_cih pra_n.asamha_ram kr.tava_n samvatsaram tada_ (Skanda 7.32.40).**
> **dadhi_ci had breathed his last a year later.**
> **Nanda_ subhadra_ surabhih sus'I_la_ sumana_ tatha_ iti goma_tarah pan~ca goloka_cca saka_gata_h** (Skanda 7.32.44).

Nanda_, subhadra_, surabhi, sus'i_la_ and sumana__ are the names of the five cows who came from the Cow-world (at the call of the gods).

> **yadetadr.s.in.a tyaktam svameva kalevaram**
> **etanma_m.sa_dinirmuktam kriyata_masthipan~jaram** (Skanda 7.32.46)

(Gods said) This is the corpse left by the r.s.i; make it a skeleton devoid of flesh etc.

The cows did as asked and reported to Brahma who asked the gods to touch all parts of the bodies of the cows to sanctify them. The gods did as asked but left the mouths of the cows untouched. Thus the mouth of a cow became blameful and impure. (apavitram bhavetta_sa_m mukhamekam jugupsitam: Skanda 7.32.51). Then, Sarasvati_ said: you are sinners of Brahman.icide (bhavatyo brahmagha_tika_h); why else didn't the gods touch your mouths? (**anyatha_ ka_ran.a_tkasma_nna spr.s.t.amamarairmukham: Skanda 7.32.52). tatasta_bhyistu sa_ prokta_ devi_ tatra sarasvati_ naitatte vacanam**

yuktam vaktumevamvidham mukham asma_kameva hr.dayamanena vacasa_ tvaya_ nirdagdham yena tasma_ttvamacira_dda_hama_psyasi (Skanda 7.32.53-54).

Then the cows said: your speech about our mouths is not apposite. As a recompense for this statement of yours which has burnt our hearts, you will soon become thirsty.
So saying the cows departed to their world.
This extraordinary legend is perhaps a reference to the drying up of the river.
Va_mana Pura_n.a:
Gods ask: katham ca sara a_sa_dya kr.tva_ ti_rtha_ni pa_rs’vatah praya_ta pas’cima_ma_s’a_m dr.s’ya_dr.s’yagatis’ubha_ etadvistarato bru_hi ti_rtham brahmavida_mvara
Prime among the sacred, the sacred river visible and invisible, has on both her banks sacred pilgrimage places and moved westward; expound on this. (Va_m. P. 32.2)
Lomahars.an.a uva_ca--
plaks.avr.ks.a_tsamudbhu_ta_ saricchres.t.ha_ sana_tani_
sarvapa_paks.ayakari_ smaran.a_dapi nityas’ah
sais.a_ s’ailasahasra_n.i vida_rya ca maha_nadi_ pravis.t.a_ pun.yatoyais.a_ vanam dvaitamiti s’rutam
Lomahars.an.a said: The best of streams and the ancient stream emerged from the Plaks.a tree and by very remembrance of her will remove all sins. It is said that this great river has sundered hundreds of mountains and entered dvaita forest. (Va_m. P. 32.3-4)
Tasmin plaks.e stitha_m dr.s.t.va_ ma_rkan.d.eyo maha_munih pran.iyatya tada_ mu_rdhna_ tus.t.a_va_tha sarasvati_m
Then Sage Ma_rkan.d.eya saw Sarasvati_ standing on the Plaks.a tree and bowing his head, started his invocation and prayers to the River goddess. (Skanda 32.5)
Evam stuta_ tada_ devi_ vis.n.orjihva_ sarasvati_ prayuva_ca maha_tma_nam ma_rkan.d.eyam maha_munim yatra tvam nes.yase vipra tatra ya_sya_myatandrita_
Listening to the prayer, the devi who is the tongue of Vis.n.u replied to the Sage Ma_rkan.d.eya: O sage, I will go promptly wherever you take me. (Skanda 32.23).
Ma_kan.d.eya uva_ca—

A_dyam brahmasarah pun.yam tato na_gahr.dam smr.tam kurun.a_ r.s.in.a_ kr.s.t.am kuruks.etram tatah smr.tam tasya madhyena vai ya_hi pun.ya_pun.yajala_vaha_

Ma_rkan.d.eya said: from ancient times, there is a sacred lake called brahmasarovar; after that was formed na_gahr.da lake from the days when the Kuru king prepared it. From those days it is called Kuruks.etra. You pass through these lakes carrying your pure and impure waters.

The brahmasarovar near Kuruks.etra is also called sannihati_ lake, derived from the convergence of five ti_rthas into this lake every month. A sacred bath in this sarovar on the day of the new moon (ama_va_sya_) and solar eclipse and the performance of s'ra_ddha on the occasion is said to bring merit accruing from the performance of a thousand as'vamedha yajn~as:

ma_si ma_si naravya_ghra sannihatya_m na sams'ayah
ti_rthasannihana_deva sannihatyeti vis'ruta_
ama_vasya_m tu tatraiva ra_hugraste diva_kare
yah s'ra_ddham kurute martyah tasya pun.yaphalam s'r.n.u
as'vamedhasahasrasya samyagis.t.asya yatphalam (MBh. G.P. edn. Vana, 83.195-197).

Br.hanna_radi_ya Pura_n.a (Part 1. 17-18) notes that Ma_rkan.d.eya did his penance at the place where Sarasvati_ emerged from the Plaks.a and flowing through Sannihita lake coursed westwards. (**ma_rkan.d.eyena munina_ santaptam paramam tapah yatra tatra sama_ya_ta_ plaks.aja_ta_ sarasvati_ sa_ sabha_jya stuta_ tena munina_ dha_rmiken.a ha sarah sannihitam pla_vya pas'cima_m prasthita_ dis'am**).

Ta_n.d.ya Bra_hman.a (25.12.19) confirms that Sarasvati_ was west-flowiing (pratyan:gmukhi_ khalu sarasvati_ pravahati).

और्वभृगुवच्छुचिम् अप्नवानवद् आ हुवे ।
अग्निं समुद्रवाससम् ॥

8.102.04 Like Aurva Bhr.gu and like Apanva_n, I invoke the pure Agni, dwelling in the midst of the sea. [Aurva Bhr.gu: Aurva, the descendant of Bhr.gu (sometimes he is called the son, sometimes the grandson, and sometimes only the descendant); Aurva became the submarine fire; or, aurvabhr.gu = like Aurva and Bhr.gu (dvandva compound); Apnava_na: mentioned as one of the Bhr.gus in RV 4.7.1; dwelling in the midst of the sea: samudrava_sasam = samudramadhyavartina_m, clothed or hidden by the sea]. Sa_yan.a further explains that samudrava_sasam =

samudramadyavartinam va_d.avam, the submarine fire in the midst of the ocean. Aurva_h are a class of Pitr.s (Ta_n.d.ya Maha_bra_hman.a). aurva = descendant of u_rva (TS 7.1.8.1); u_rvya = being in receptacle, being in fire, the submarine fire (VS 16.45); nama u_rvya_ya ca su_rya_ya ca (TS 4.5.9.2); u_rva = receptacle (RV 3.1.14).

The reference to Bhr.gu is reiterated in the legend which equates the submarine fire witgh Aurva, the son of Bhr.gu.
Evidence for neotectonism has been found in the rock-cut terraces on the upper reaches of the Markanda river. (Rajaguru, S.N., 1977, *Ecology and Archaeology of Western India*, D.P. Agrawal and B.M. Pande, eds., New Delhi, Concept Publishers, p. 70).

The Great Epic (MBh. Anus'a_sana. 139.22-26) provides a legend which links Sarasvati_ and the tectonic upheaval or the great deluge. Varun.a refuses to return Sage Utathya's bride Bhadra_ whom Varun.a had forcibly abducted. Sage Utathya drinks off the entire water of the ocean. The region is reduced to a desert. Utathya asks Sarasvati_ to go invicible into the desert so that, forsaken by her, the ocean becomes inauspicious. There is a river named Bhadra_ close to Prabha_sa which links this city with Rojdi and perhaps Lothal in ancient times, establishing the possible palaeo-channel of the Sarasvati_ river in Saura_s.t.ra.

The repeated references to the fiery upheavals and the disappearance of the Sarasvati_ into the sands of the desert in the Great Epic and the Pura_n.as are a strong indication that some significant tectonic event alone would explain the changes in the courses of rivers observed by earth scientists, confirming the veracity of the accounts given in the Hindu ancient texts.

The Great Deluge occurred at the time of Manu Vaivasvata who is assigned to dates of great antiquity. N.N. Law (1965, *Age of the Rgveda*, Calcutta, p. 143) dates Manu Vaivasvata to ca. 4000 BC. P.L. Bhargava (1956, *India in the Vedic Age*, Lucknow, p. 133) estimates the date to be ca. 3000 BC. A.D. Pusalkar (1951, *The Vedic Age*, London, p. 269) dates Manu Vaivasvata to 3110 BC. The dates of Bhargava and Pusalkar are close to the traditional reckoning of the start of the Kali Yuga in 3102 BC.

Padma Pura_n.a notes that Sarasvati_ is samudraga_mini_, flowing to the ocean (PP V.27.119), a clear statement distinguishing Sarasvati_ as a mighty

river and not merely a tributary of some other larger river. This echoes Rigvedic description of Sarasvati_ as: giribhya a_ samudra_t, from the mountains to the ocean.

Matsya Pura_n.a identifies the original source of Sarasvati_ to be the lake of snakes (sarpa_n.a_m tatsarah_ on the Hemaku_t.a mountain. It is from this lake that both Sarasvati_ and Jyotis.mati_ (Reva_ river) originated and ran into the western and eastern seas. (MP CXXI.64-65). Matsya Pura_n.a (7.2-3) reports a legend: when the Devas and Asuras battled, Lord Vis.n.u destroyed the progeny of Diti. Diti then went to Syamantapan~caka, a holy region on the banks of the Sarasvati_ river and did penance for a long time worshipping her husband. The Pura_n.a also recounds the sacred ti_rthas of the river basins, famed for performing s'ra_ddhas or offerings to ancestors: Pitr.ti_rtha, Ni_lalakun.d.a, Rudrasarovara, Ma_nasarovara, Manda_kini_, Acchoda, Vipa_s'a_, Sarasvati_. (MP XXII.22-23).

Waters are associated with the creation of the world and with Sarasvati_. "The Veda speaks constantly of the waters or the rivers, especially of the divine waters which carry in them the light of the luminous solar world or the light of the Sun, svarvati_r a_pah. The passage of the waters effected by the Gods or by man with the aid of the Gods is a constant symbol. The three great conquests to which the human being aspires, which the Gods are in constant battle with the Vritras and Pan.is to give to man are the herds, the waters and the Sun or the Solar world, ga_h, a_pah, svah."(Aurobindo, *On the Veda*, Pondicherry, 1956, p. 125).

The a_pri_ hymns refer generally to the three goddesses: sarasvati_, bha_rati_, il.a_ who are invoked to the sacrificial seat, to delight and to offer welfare to the devotees. (RV 1.188.8; 3.4.8; 7.2.8; 9.5.8; 10.70.8; 10.110.8). Of the ten a_pri hymns, three are in man.d.ala one, two in man.d.ala ten and one each in other man.d.alas excepting the fourth and the sixth. Hymn 8 or 9 of all these su_ktas invokes tisro devi_h. Other a_pri deities are the divine doors (dva_ro devi_h), dawn and night, the dual deity (us.a_sa_nakta_), Tvas.t.a_, Agni and others. A r.ca mentions Mahi_ and Hotra_ in addition (RV 1.142.); and two r.cas mention mahi_ in lieu of bha_rati_ (RV 1.13.9; RV 5.5.8). A_pri_ is a self-contained propitiatory (a_pri_) rite, perhaps a minor daily offering; "such a hymn was not to charcterise any specialized sacrifice in honour of any particular deity but one where all the divinities would receive their share without any distinction…The tribe of Bharata was clearly the most popular one

while the sacrificial ritual was growing. This growth was apparently taking place on the banks of the great R.gvedic river Sarasvati_ and its tributaries. Bharata were the first to attain such predominance and hence their family deity or deities naturally came to be associated with the sacrificial ritual. The first offering to the gods was also poetically sought to be glorified like the first Hotr. Priest and it found expression in the conception of il.a_, thus enabling the poet to form a trinity of divinities, all having poetic association with the sacrifice". (K.R. Potdar, A_pri_ hymns in the R.gveda, a study, *Journal of the University of Bombay*, Sept. 1945-Sept. 1946; A_pri Hymns in the R.gveda, *12th AIOC, 1943-44, Proceedings*, Benares Hindu University, 1946, pp. 211-222). There are indications that one A_pri_ hymn was adapted by by various families of Vedic sages with poetic adaptations since the hymns follow a pattern of propitiating a list of divinities or artifacts or persons associated with the yajn~a, starting with Agni.

आ भार॑ती भार॑तीभिः स॒जोषा॒ इळा॑ दे॒वैर् म॑नु॒ष्ये॑भिर् अ॒ग्निः ।
सर॑स्वती सारस्व॒तेभि॑र् अ॒र्वाक् ति॒स्रो दे॒वीर् ब॒र्हिर् एदं स॑दन्तु ॥

3.004.08 May Bha_rati_, associated with the Bha_rati_s; Il.a_ with the gods and men; and Agni, and Sarasvati_ with the Sa_rasvatas; may the three goddesses sit down upon the sacred grass (strewn) before them.[bha_rati_bhih, with the connections of Bharata, or the Sun: bharatasya su_ryasya sambandhini_bhih, perhaps intending the solar rays; Bha_rati_ = va_k, speech; Il.a_ = bhu_mi, the earth; sarasvati_ = ma_dhyamika_ va_k; the sa_rasvatas are the madhyamastha_nas, the middle regions, or the firmament; Agni whose name is rather unconnectedly inserted, is thus identified through their several personifications as goddesses, with heaven, mid-heaven, and earth, or with speech or sound in the three regions].
[The same r.ca is repeated in RV 7.2.8]. This explains how the three names, bha_rati_, il.a_ and sarasvati_ relate to the same divine phenomena related to va_k as the a_pri deity, but occurring in three locasions in space: on the celestial sky (bha_rati_ related to the sun), on the atmosphere (sarasvati_) and on the earth (il.a_). In RV 2.1.11, Agni is related to the divine forms as: Aditi for gifts, Bha_rati_ for lauding praises (hotra_, vardhase gira_), Il.a_ for strength (daks.ase) limitless duration (s'atahima_m.si) and Sarasvati_ for wealth and release of the waters. (vasupate vr.traha_). Il.a_ is the mother of cattle herds (RV 6.41.19); and is

personified oblation of the sacrificial offering of milk and butter, both derived from the cow (Sa_yan.a on RV 7.16.8; cf. 7.3.7). Il.a_ is a synonym for cow. (Nighan.t.u 2.11); her epithets are: butter-handed (RV 7.16.8) and butter-footed (RV 10.70.8). She personifies flowing libations (RV 10.36.1) and the gifts of the cow (RV 3.1.23) and is called praja_vati_, dhenumati_ (RV 8.31.4). The pressing stones are il.a_vantah (RV 10.94.10) and the altar is il.a_'s place (il.a_yah pada: RV 3.29.4). As the great cow, Il.a_ sprinkles with the milk of r.ta (world order)(RV 5.55.13). Pr.thivi_, the earth herself, is an epithet of Il.a_ (RV 3.23.4).

Taittiri_ya A_ran.yaka (8.1.1) pinpoints the location of Kuruks.etra:

> **...tes.a_m kuruks.etram vedira_si_t tasyai kha_n.d.avo**
> **daks.ina_rdha a_si_t tu_rghnamuttara_rdhah**
> **parin.ajjaghana_rdhah mara utkarah...**

The sacrifice performed by the devas used Kuruks.etra as their altar. The kha_n.d.ava (or region near kha_n.d.ava prastha or Indra prastha) constituted the southern half of this altar. Tu_rghna (or Srughna) was its northern half, Parin.at the lower or western half and the Marus or the Marwar desert was its rubbish pit. Parin.at was perhaps the lower part of the Sarasvati_-Dr.s.advati_ doab. (Bharadwaj, O.P., 1991, *Ancient Kuruks.etra*, New Delhi, Harman Publishing House: p. 8).

MBh composed in the cradle of Vedic civilization, refers to the rivers Sarasvati_ and Dr.s.advati_ as the northern and southern boundaries of the holy Kuruks.etra region; a sacred lake called ma_nus.a is said to be located at a distance of one kros'a to the west of the river a_paga_. (MBh. 3.83). The reference to ma_nus.a may be a reference to the lake Ma_nus.a close to Kuruks.etra,10 kms. west of Kaithal is a place called Mansa. A_paga_ is the a_paya_ of the R.gveda (3.23.4; the hymn composed by r.s.is devas'rava_ and deva_ta of the clan of Bharatas): Va_mana Pura_n.a calls Sarasvati_, kuruks.etra-prada_yini, since she flowed through the region of Kuruks.etra.

The yajn~a for the da_rs.advata session has to start near the confluence of river Dr.s.advati_ at Parin.ah. There are many references in S'an:kha_yana S'rauta Su_tra (Varadattasuta A_narti_ya and Govinda, Commentators., Alfred Hillebrandt, ed., 2 vols., Reprint, Delhi, 1981):

> **sarasvatya_ vinas'ane di_ks.a_ sa_rasvata_na_m (13.29.1)**

prati_pam pu_rven.a paks.asa_ yanti (13.29.11)
apyaye dr.s.advatya_h (13.29.14)
samvatsare pari_n.ahyagni_na_dha_ya dr.s.advatya_ daks.in.ena ti_ren.a_gneyena_s.t.a_kappa_lena s'amya_para_se s'amya_para_se yajama_nja aiti (13.29.29)
trih plaks.a_m prati yamuna_mavabhr.thamabhyavayanti (13.29.30)

Jaimini_ya Bra_hman.a refers to Parin.ah as the name of a lake in the lower half of Kuruks.etra.

tes.a_m u tes.a_m pari_n.aditi kuruks.etrasya jaghana_rdhe saraskandantam di_ks.a_yai te pra_n~co yanti samaya_ kuruks.etram (Raghuvira, ed., Nagpura, 1954: 2.300).

La_t.ya_yana S'rauta Su_tra (10.19.1) explains Parin.ah as 'bhu_merunnataprades'ah' or risen ground:

samvatsara_du_rdhvam pari_n.am na_ma sthali_ kuruks.etre tasya_magni_na_dha_ya

This interpretation seems to be confirmed by Ka_tya_yana S'rauta Su_tra (24.6.32):

kuruks.etre parin.ahi sthalegny a_dheyamanv a_rambhan.i_y a_ntam bhavati

Sarasvati_ and phases of the moon

Aitareya Bra_hman.a (7.11), Gopatha Bra_hman.a (2.1.10), S.advim.s'a Bra_hman.a note that Sini_va_li_, Ra_ka_ and Gun:gu_ denote different phases of the moon and associated with fertility, conception and childbirth (RV 10.85.4). [sini_va_li_, of the day before the new moon; ra_ka_, of full moon, gun:gu_ (perhaps identical with Kuhu_), of new moon]. Sarasvati_ is associated with Ra_ka_ and Br.hyaddiva_ (an epithet of Ra_ka_, according to Sa_yan.a, representing a very brilliant form) in RV 5.42.12. Sarasvati_ is associated with Sini_va_li_, who is invoked to set the embryo (garbham dehi) and is described as the sister of the gods (deva_na_m svasa_) and mistress of the family (Vis'patni_) (garbham dhehi sini_va_li_ garbham dhehi sarasvati_:

RV 10.184.2 = AV 5.25.3; RV 2.32.6-7: vis'patni_ may also connote, 'mistress of the people'.) Sini_va_li_ is described as of broad hips, fair arms and fair fingers (cf. note the early iconography of fertility) and asked to grant progeny (praja_m devi_ didi_d.d.hi nah); she is asked also to be responsible for the birth of many (bahusu_vari_) (RV 2.32.6)

या गु॒ङ्गू॒र्या सि॑नीवा॒ली या रा॒का या सर॑स्वती ।

इ॒न्द्रा॒णीम॒ह्व॑ ऊ॒तये॑ वरुणा॒नीं स्व॒स्तये॑ ॥

2.032.08 I invoke her who is Gun:gu_, who is Sini_va_li_, who is Ra_ka_, who is Sarasvati_; (I invoke) Indra_n.i_ for protection, Varun.a_ni_ for welfare. [Gan:gu_ = kuhu, the day of conjunction, when the moon rises invisible; these phases of moon were perhaps, identifiable with Indra_n.i_ or Varun.a_ni_, or with both].

As part of the marriage ceremony hymns of Atharvaveda, Sarasvati_ and Sini_va_li_ are invoked, to place the embryo in its proper place:

prati tis.t.ha vira_d.asi vis.n.uriveha sarasvati
sini_va_li pra ja_yata_m bhagasya sumata_vasan

AV 14.2.15 Stand firm; vira_j are thou; as it were, Vis.n.u here, O Sarasvati_; O Sini_va_li_, let her (the bride) have progeny; may she be in the favour of Bhaga.

In the saptapadi_ ceremony (when bride and bridegroom take seven steps around the fire altar solemnizing the marriage), Sarasvati_ is invoked to be gracious to the performance and Vis.n.u, to lead the bride. (Ma_nava Gr.hyasu_tra 1.11.18).

Following on the same theme, Sarasvati_ alone is invoked to foster the embryo: Hiran.yakes'i_ Gr.hyasu_tra 1.20.1; Pa_raskara Gr.hyasu_tra 1.7.2. Paippila_da Sam.hita_ 5.11.5; 11.1.6 invoke Sarasvati_ together with Sini_va_li_, Anumati, Ra_ka_, Gun:gu_ and Indra_n.i_.

Sarasvati_ is su_kta bha_k, celebrated in complete hymns of R.gveda (RV 6.61, 7.95 and 7.96), apart from references in scores of other r.cas.

Sarasvati_'s association with va_k is emphatic in the Bra_hman.as. (va_g vai sarasvati_, va_k tu sarasvati_: S'B 2.5.4.6; 3.9.1.7; 7.5.1.31; 11.2.4.9; 12.9.1.13; Ait.Br. 3.1; 2.24; 6.7; Tait. Br. 1.3.4-5; 3.8.11-12; Gopatha Br. 2.1.20). Va_k is exchanged for soma with the gandharvas. (S'B 3.2.4.3); she is addressed as intelligence and daks.in.a_ and is identified with the Soma-cow, given as price for the Soma (S'B 3.2.4.15-17). When the sun was accepted as the sacrificial fee, in preference to her, Va_k turned into a lioness. (S'B3.5.1.21).

A legend relates how Va_k was won by the gods with the help of Yajn~a and by obscuring her in fire kept her away from the asuras. (S'B 3.2.1.18-23). Va_k denotes the greatness (mahima_) of Praja_pati which departed from the latter as soon Praja_pati had created Agni and the gods. (S'B 2.2.4.4). Va_k is praja_pati; praja_pati is the lord of Va_k. (S'B 1.6.3.27; 5.1.5.6; 13.4.1.15; Tait. Br. 1.3.4.5; S'B 3.1.3.22: praja_patir vai va_kpati_); S'B 5.1.1.16: praja_patir vai va_caspati_). These statements are intended to connote that Va_k created this Universe. Praja_pati identified as Brahma_ is known only in the A_s'vala_yana Gr.hyasu_tra (3.4). As Praja_pati gets identified as the sun (VS 31.18-22), Sa_vitri_ is equated with Va_k in the bra_hman.as (Gopatha Br. 1.1.33; Ta_n.d.ya Br. 10.12.7). "Praja_pati at the beginning was alone in this (universe); Va_k was the second. They united. She conceived, and (then) went away from him. She produced (all) these generations and entered again into Praja_pati." (praja_patirva_ idama_sittasya va_g dviti_ya_si_t, ta_m mithunam samabhavat, sa_ garbhamadhatta, sa_sma_dapa_kra_mat, sema_h praja_ asr.jata, sa_ praja_patimeva punah pra_vis'at: Ka_t.haka Sam.hita_ 12.5; 27.1; Kapis.t.hala Sam.hita_ 42.1; cf. Jaimi. Br. 2.244; Ta_n.d.ya Br. 20.14.2). Jaimini_ya Bra_hman.a notes that Praja_pati transforming himself into Va_k became all this (Universe). (Jaimi. Br. 1.314: va_g bhu_rva_ sarvam vyabhavat).

Six man.d.alas (2 to 7) of the R.gveda are attributed to the six major families of the Vedic r.s.is: 1. Gr.tsamada Bha_rgava; 2. Vis'va_mitrta; 3. Va_madeva; 4. Atri; 5. Bharadva_ja; 6. Vasis.t.ha. The eighth man.d.ala is attributed to the family of Kan.va and An:girasa. In addition to this classification, the anukraman.i of the sam.hita_ provides the names of the R.s.is of every single r.caa of the remaining man.d.alas, 1, 9 and 10. Among such names of r.s.is are: Us'anas Ka_vya, Cyavana Bha_rgava, Jamadagni Bha_rgava, Ra_ma Ja_madagnya who are stated to be from the Bhr.gu family. For e.g., RV 9.65 is attributed to Bhr.gu and Jamadagni; and RV 10.19 is attributed to Bhr.gu and

Mathita, son of Yama and Cyavana. According to R.gveda Sarva_nukraman.i_ 1.4, a R.s.i is one who recites the mantra form of the sentence: yasya va_kyam sa r.s.ih. Sa_yan.a in his bha_s.ya notes that r.s. gatau iti dha_tuh or derives the word from the root, r.s., 'to go' and also connects the word with dr.s' 'to see' explaining that the Veda is revealed to the sages through the favour of god. R.s.i thus visualizes the Veda. Ya_ska (Niruktam 2.11) cites the views of Aupamanyava: r.s.ir dars'ana_t stoma_n dadars'a iti aupamanyavah. The R.s.is discover the Veda and bring it to the notice of the descendants. The Nirukta (1.20: sa_ks.a_t kr.t dharma_n.a r.s.ayo vabhuvuh) further notes that the mantras are directly revealed to the R.s.is through their meditation and prescience and hence the R.s.is are su_ktadras.t.a_rah. Taittiri_ya A_ran.yaka (2.9: aja_n ha vai pr.s'ni_stapasyama_na_n brahma svayam bhubhya_nars.at tadr.s.ayobhavan) expands the explanation further: R.s.i = abhi+a_+r.s., 'to go forward', 'to appear'. The Indian tradition is that the bards or su_ta's preserved the memories of geneaologies of kings and r.s.i's. A Pura_n.a is defined as consisting of five distinct characteristics (pan~calaks.an.am):

Sargas'ca pratisargas'ca vam.s'o manvantara_n.i ca vam.s'ya_nucaritam caiva pura_n.am pan~calaks.an.am (quoted in Brahma_n.d.a P. 1.1.37-38; Va_yu P. 4.10-11; Matsya P. 53-65; Ku_rma P. 1.1.12; Vara_ha 2.4; Garud.a P. 1.215.14; Bhavis.ya P. 1.2.4-5; Brahmavaivarta_ P. 4.113.6; Devi_ Bha_gavata 1.2.18; with slight modifications in: Vis.n.u P. 3.6.25; Agni P. 1.14). The five characteriests which formed the kernel of the Pura_n.as are:

Sarga, the creation of the universe (Brahma's seven mind-born sons assisted him in creation: Mari_ci, Atri, An:girasa, Pulastya, Pulaha, Kratu and Vasis.t.ha; in Vis.n.u P. 1.7.5 Bhr.gu and Daks.a are also added as the eighth and ninth sons; Matsya P. 3.8 adds Na_rada as the tenth son; vis'va_mitro jamadagnir bharadva_jo tha gotamah atrir vasis.t.hah kas'yapa ityete sapta r.s.yah: Baudha_yana S'rauta Su_tra, Pravara_dhya_ya, 547);

Pratisarga, recreation after destruction;
Vam.s'a, genealogy of gods and patriarchs;
Manvantara, the great periods of time with Manu as the Primal ancestor;
Vam.s'a_nucarita, history of the dynasties both solar and lunar.

Brahma P. 5.4; Brahma_n.d.a P. 1.36.3 and Va_yu P. 62.3 provide the names of 11 manvantaras: 1. Sva_yambhuva; 2. Sva_rocis.a; 3. Auttama; 4. Ta_masa; 5. Raivata; 6. Ca_ks.usa; 7. Vaivasvata; 8. Sa_varn.i; 9. Bhautya; 10. Raucya;

and 11. Maru-Sa_varn.i. In each manvantara, prominent sages and gods are listed. During Sva_yambhuva Manvantara the seven sages listed are: Mari_ci, Atri, An:gira_, Pulaha, Kratu, Pulastya and Vasis.t.ha (who were also the Sapta R.s.is of the north, when Yama_ was the presiding deity of the age). Similarly, the ten sons of Manu-Sva_yasmbhuva are listed as: Agnidhra, Agniba_hu, Medha_, Medha_tithi, Vasu, Jyotis.ma_n, Dyutima_n, Havya, Savanah and Putra. Aurva is reckoned as one of the seven sages during the Sva_rocis.a manvantara (Brahma P. 9.30); R.cika (also known as the son of Aurva or Ka_vyaputra) is listed as one of the seven sages of the seventh manvantara (Brahma P. 10.28). Bha_rgava Prayoga invokes Agni as Aurva, the grandson of Bhr.gu; as Bhr.gu himself and Apnava_n (the ordainer of the sacrifice) had done in the past: RV 8.102.4):

Bhr.gu are artisand ans chariot-builders:

ए॒वेद् इन्द्रा॑य वृ॒ष॒भाय॒ वृष्णे॒ ब्रह्मा॑कर्म॒ भृग॑वो॒ न रथ॑म् ।

नू चि॒द् यथा॑ नः स॒ख्या वि॒योष॒द् अस॑न् न उ॒ग्रो ऽवि॒ता त॑नू॒पाः ॥

4.016.20 Therefore we offer to the vigorous Indra, the showerer (of benefits), holy adoration, that he may never withdraw his friendly (actions) from us, and that he may be our powerful protector, the defender of (our) persons, as the Bhr.gus (fabricate) a car (for use). [Bhr.gavo na ratham: bhr.gavo = di_ptas taks.a_n.ah, bright or dexterous carpenters; i.e. as a wheelwright makes a chariot for a special purpose, so the worshipper performs worship in order to secure Indra's favour].

ए॒तं वां॒ स्तोम॑म् अश्विनाव् अक॒र्मात॑क्षाम॒ भृग॑वो॒ न रथ॑म् ।

न्य् अमृक्षाम॒ योष॑णां॒ न मर्ये॒ नित्यं॒ न सू॒नुं तन॑यं॒ दधा॑नाः ॥

10.039.14 For you, As'vins, we have made, we have built this praise, as the Bhr.gus (built) your car; cherishing this praise like a son, the eternal performer of rites, we have decked (with ornaments, your laudation) among men, as if had been a wife. Sa_yan.a's comment: karmayoga_d r.bhavo bhr.gava ucyante athava_ rathaka_ra_h bhr.gavah.

Jaimini_ya Bra_hman.a (2.201) narrates a legend: Varun.a was consecrated with sixteen kinds of water; luster (bharga) departed from Varun.a's body and the luster was divided into four parts. Out of these four parts were born: Bhr.gu, Sarasvati_, Das'a_peya sacrifice and S'ra_yanti_ya (Sa_man). Taittiri_ya A_ran.yaka (9.1) and Taittiri_ya Upanis.ad (3.1 to 3.4) note that Bhr.gu is also known as Va_run.i_. R.s.i Gr.tsamada is the son of S'unaka of Bhr.gu family. Bha_rgava Jamadagni is the father of Paras'ura_ma and is the preacher of Aks.ara Brahman. Cyavana is the son of Bhr.gu and knew the divine knowledge of S'iva (Vastupa), according to Jaimini_ya Bra_hman.a. When Cyavana was reduced to a decrepit condition, he advised his sons to put him down thrice on the part of the Sarasvati_, the Fountain of youth and leave him there. At first, the sons hesitated for fear of public censure; but Cyavana told his sons about the rich gain which will result by his rejuvenation and convinced them to follow his instructions. The sons put him thrice on the Sarasvati_ pool and left him there. Unable to move, Cyavana wished for three things: 1. he wanted to be rejuvenated; 2. he desired a maiden for his wife; and 3. he wanted to make a yajn~a with a thousand cattle. Then Cyavana perceived the chant called Cya_vana and lauded it to fulfil his desires. While the chant was in progress, S'arya_ta, the son of Manu was in the vicinity. Some young cowherds found Cyavana's body and smeared the body with dirt and ash-whitened balls of cowdung. This was considered an offence and Cyavana caused discord among S'arya_tas and as a consequence the mother and the son could not recognize each other. The discord was reported to S'arya_ta who in turn reported to the king. S'arya_ta recognized the sage and sought the r.s.i's pardon for his faults. The sage demanded Sukanya_, S'arya_ta's daughter as an expiation. At that time, the As'vins, the two physicians were on the earth and saw Sukanya_. The As'vins wanted to persuade Sukanya_ to leave the old man who was not perfect. Cyavana communicated to the As'vins through Sukanya_ that Cyavana was perfect because he enjoyed Soma and that the As'vins were imperfect since they wee deprived of Soma. Cyavana struck a bargain with the As'vins: if they would rejuvenate him, he would make them enjoy Soma. The As'vins carried him to the place off the Sarasvati_ for this purpose. Cyavana emerged from the pool rejuvenated and young. Cyavana instructed the As'vins how the gods were performing a 'headless' sacrifice in the field of the Kurus. The head of sacrifice was really known to Dadhya_n~c. As'vins asked Dadhya_n~c to tell them with the head of a horse and Dadhya_n~c then taught the As'vins the 'head (s'iras) of the sacrifice'. Indra cut off Dadhya_n~c's equine head but the wise As'vins again put on Dadhya_n~c's head. They went to the field of the Kurus and bargained with the gods about the 'head of

sacrifice' to achieve the right to Soma. The gods assented and the As'vins became the priests with the right to Soma. After rejuvenation, Cyavana went to S'arya_ta and conducted his sacrifice. S'arya_ta gave him a thousand cattle. Thus it was that Cyavana drew out of the Sarasvati"s Fountain of youth whatever food he wanted. (Jaimini_ya Bra_hman.a).

This concordance between Sarasvati's Fountain of youth and Dadhya_n~c finds an echo in the concordance between Sarasvati_ and her description ad ghr.ta_ci_. Dadhi and Ghr.ta are curds and clarified butter, used as ingredients in the Soma sacrifice. The metaphor of Soma as electrum can be seen to be concordant with the use of the flesh of the horse, clarified butter and indha (fuel) to generate intense heat (about 1500 degrees C.) required to reduce the ore by oxidizing the impure elements. The 'horse head' finds its reflection in the story of the fire called 'bad.ava_gni' (bad.ava = mare). Aurva is a r.s.i in the Bhr.gu dynasty who were the gurus of the kings of Hehaya such as Kr.tavi_rya, father of Ka_rtavi_rya_rjuna, who was slain by Paras'ura_ma. Aurva forced the fire of his penance down into the sea. The belief is that this fire takes the shape of a horse-head and still lives underneath the sea vomiting heat at all times. (MB, A_di Parva, Ch. 180; 1.171.19: manyujognirdahanna_po loka_ hya_pomaya_h smr.tah). The S'alyaparvan of the Great Epic adds the legend of a son born to Dadhi_ca. To divert Dadhi_ca from his austere penance, Indra deputed a beautiful damsel, Alambusa_. Seeing the damsel, Dadhi_ca's retas came out and fell into the river Sarasvati_. It grew into a child under the care of the river goddess Sarasvati_. The river in person presented the child to Dadhi_ca. Dadhi_ca blessed Sarasvati_ to be pure and also that the water of Sarasvati_ would be used as oblations by the Vis'vadevas, Gandharvas, R.s.is, Apsarasas. The child was named as Sa_rasvata after the river. **When draught continued for a period of twelve years, all the sages fled away for sustenance. But Sa_rasvata continued to live there with the food supplied by the river Sarasvati_ and continued to impart Vedic lore to the Bra_hman.as.**

When the Haihaya successors of King Kr.tavi_rya started maltreating the Bha_rgavas, the latter fled to other countries for safety (MBh I,178,6802 to 179,6827). At that time, the king of Ka_nyakubja was Ga_dhi. Bha_rgava r.s.i R.ci_ka Aurva, son of U_rva, married Ga_dhi's daughter Satyavati_ and had a son Jamadagni. About the same time, Ga_dhi had a son called Vis'varatha. (Va_. P. 91,92-3). Vis'varatha succeeded to the kingdom, later relinquished the kingdom and placed his family in a hermitage near Ayodhya_. After

relinguishing the kingdom, he performed austerities for twelve years and became a brahman with the name Vis’va_mitra.

Sages performed sacrifices on the bank of the river Sarasvati_. Bhr.gu was dep;uted to visit the abodes of the gods to relate the virtues of the trinity, namely, Brahma_, Vis.n.u and S’iva. (Bha_gavata P. 10.89.1-9). Na_ra_yan.a imparted to Va_lmi_ki the Sarasvati_ mantra which was like a kalpavr.ks.a fulfilling all desires. This was done in the holy land of Bharatavars.a on the bank of the Gan:ga_. Brahma_ imparted this mantra to Bhr.gu in the Badarika_s’rama. On the occasion of solar eclipse, Bhr.gu imparted the mantra to S’ukra in the Pus.kara ti_rtha. The tradition is that if this holy formula is chanted four lakhs times, it would bring success and would make the person concerned as powerful as Br.haspati. Brahma_ also gave a kavaca (amulet) called Vis’vajaya to Bhr.gu on the Gandhama_dana mountain. Brahma_ narrated the significance of the Sarasvati_ Kavaca which fulfills all desires like the kalpavr.ks.a. Using the kavaca, persons like S’ukra, Br.haspati, Va_lmi_ki, Kan.a_da, Gautama, Kan.va, Pa_n.ini and S’a_kata_yana attained celebrity status in the society. (Devi_ Bhagavata 9.4.53-61).

Bha_rgava Vaidarbhi is known as the composer of the Athravaveda and Pippala_da explains in Prasna Upanis.ad (1.1) to him and to others about the Supreme Brahman. Bha_rgava It.a (seer of RV 10.171) is a son of Bhr.gu. Vipula, Ma_rkan.d.eya and Uttanka are also Bha_rgavas. The family of Bhr.gu can be depicted as: 1.Varun.a—2.Bhr.gu—3.Cyavana, It.a, Kavi and Jamadagni; Kavi’s son was Us’anas and Jamadagni’s son was Paras’ura_ma.

According to the Maha_bha_rata (12.285.17), there were four principal gotras: 1. An:gira_; 2. Kas’yapa; 3. Vasis.t.ha; and 4. Bhr.gu. Bhr.gus are mentioned as a group of people in the episode of the da_s’ara_jn~a war referred to in the R.gveda. Puru, Anu, Druhyu, Turvas’u and Yadu were the pan~ca-jana_h or five peoples. Ka_vya-Us’anasf (a Bhr.gu) cursed Yaya_ti, a king of the Lunar dynasty which resulted in Yaya_ti’s premature old age. Yaya_ti is the son of Nahus.a. Yaya_ti had two wives: Devaya_ni_ and Sarmis.t.ha_; Yadu and Turvasu were born to Devaya_ni. Druhyu, Anu and Puru were born to Sarmis.t.ha_. Yaya_ti proclaimed Puru the king after him, since the obedient son Puru exchanged his youth for his father’s old age. [Maha_bha_rata relates how Nahus.a directed Agastya to bear his vehicle quickly from the banks of the Sarasvati_ to his destination: drutam sarasvati_ku_la_t smayanniva maha_balah: MB Anus’a_sana Parvan 13.103.12].

Druhyu's migration from Kuruks.etra to Ga_ndha_ra

Vis'va_mitra was the priest of the Bharatas. Pijavana's son Suda_sa was a leader of the Bharatas; he took the help of Tr.tsus whose priest was Vasis.t.ha. Suda_sa made Vasis.t.ha the priest of the bharatas displacing Vis'va_mitra. Angered Vis'va_mitra switched to the side of the pan~cajana_h supporting their revolt against the Bharatas. The five peoples (pan~cajana_h) and five others constituted the 'Ten Kings' (Anu, Druhyu (together with the Bhr.gus), Puru, Turvas'u, Yadu, Paktha, Bhala_nas, Alina, Vis.a_n.in, S'iva, Simyu and Vaikarn.a: since the number of these names is more than ten, it would appear the number 'ten' was used only descriptively as a large numberand not definitively as a particular number) who fought against Suda_sa (Bharatas and Tr.tsus) on the banks of the river Parus.n.i_ (Rive Iravati or Ravi; it is notable that on the left bank of this river is located the ancient site of Harappa). Suda_sa emerged victorious and established the sovereignty of the Bharatas. The following r.ca notes that Bhr.gus joined the Druhyus in their battle against Suda_sa

पुरोळा इत् तुर्वशो यक्षुर् आसीद् राये मत्स्यासो निशिता अपीव ।
श्रुष्टिं चक्रुर् भृगवो द्रुह्यवश् च सखा सखायम् अतरद् विषूचोः ॥

7.018.06 Turvas'a, who was presiding (at solemn rites), diligent in sacrifice, (went to Suda_sa) for wealth; but like fishes restricted (to the element of water), the Bhrigus and Druhyus quickly assailed them; of these two everywhere going the friend (of Suda_sa, Indra) rescued his friend. [The legend: Indra saves one of the two, Suda_sa (and perhaps slays the other), turvas'am avadhi_t; matsyaso nis'itah, fishes limited to water; the people of the country Matsya were attacked by Turvas'a, tena matsyajanapada ba_dhitah; s'rus.t.im cakruh (applied to the Bhrigus) = as'upra_ptim cakruh; sukham turvas'asys cakruh-- making the Bhrigus and Druhyus the allies of Turvas'a].

Bhr.gus are also associated with the Kan.va (Bhr.gu and Kan.va are compared with the sun and Bhr.gus gained their desires like the Kan.vas):

कण्वा इव भृगवः सूर्या इव विश्वम् इद् धीतम् आनशुः ।

इन्द्रं स्तोमेभिर् महयन्त आयवः प्रियमेधासो अस्वरन् ॥

8.003.16 The Bhr.gus, like the Kan.vas, have verily attained to the all-pervading (Indra), on whom they have meditated, as the sun (pervades the unverse by his rays); men of the Priyamedha race, worshipping Indra with praises glorify him.

Bhr.gu was so called because he arose from the flames of fire (Bhr.); another name came from the burning coals (an:ga_ra), hence called An:girasa; a third originated from extinguished charcoal (an:ga_rasam.s'raya_t) and was called Kavi. (MB. Anus'a_sana Parvan 85.15-16: bhr.gityeva bhr.guh pu_rvam an:ga_rebhyongira_bhavat an:ga_ra sams'raya_ccaiva kavir ityaparobhavat saha jva_la_bhirutpanno bhr.gustasma_d bhr.guh smr.tah). Offerings are made in fire, to the ancient fathers in the full-moon and new-moon sacrifice. Bhr.gus, together with the An:girasas, the fathers, the Na_vagvas and Atharvans are all fond of Soma and are duly honoured: an:giraso nah pitaro navagva atharva_n.o bhr.gavah somya_sah: TS 2.6.12.6; VS 19.50. Because of the tapass or luster of the Bhr.gus and the An:girasas, the purod.a_s'a cakes placed on the heath, covered with coals, burn and glow: bhr.gu_n.a_man:girasa_m tapasa_ tapadhvam ya_ni gharme kappa_la_nyu pacinvanti vedhasah: TS 1.1.7.2; VS 1.18. Kaus.itaki Bra_hman.a (30.4) notes the family of B hr.gus were later divided as Aitasa_yanas and A_janeyas. A legend notes that they were cursed by their father Muni Etasa and referred to as the worst of Bhr.gus: tasma_daitasa_yana_ a_jane_ya_h santo bhr.gun.a_m pa_pis.t.ha_h pitra_bhis'apta_h svaya_ devataya_ svena praja_patina_. The fire-priests noted are: Atri, Kan.va, Divoda_sa, An:girasa, Atharvan and Bhr.gu. An:girasas, Atharvans and Navagvas are Soma-loving fathers and are noted in the hymns to the dead (Yama) (RV 10.14.6; AV 18.1.58):

अङ्गिरसो नः पितरो नवग्वा अथर्वाणो भृगवः सोम्यासः ।
तेषां वयं सुमतौ यज्ञियानाम् अपि भद्रे सौमनसे स्याम ॥

10.014.06 The An:girasas, the Atharvas, the Bhr.gus, who are entitled to the Soma, are our recent progenitors; may we ever have a place in the favour of these venerable (pitrs.); may we be ever held in their auspicious regard. [Our

recent progenitors: navagva_ = having recently arrived, or inspiring affliction, as something new; also applied to the three classes; or, navani_ya, those condition is to be praised].

Taittiri_ya Bra_hman.a (1.1.4.8 and 3.2.7.6) notes that the consecration (a_dha_na) of the sacred Vedic fire has to be performed either by the Bhr.gus or by the An:girasas, reciting the mantra: bhr.guna_m (an:girasa_m) tva_ deva_na_m vratapate vratena dadha_mi. Gopatha Bra_hman.a are equates Atharvand and An:girasas as the two eyes of Bhr.gu: atharva_n.as'ca ho va_ an:girasas'ca bhr.gu caks.us.i_ tad brahma_bhivyapas'yastad ya_nanvayam va_ idam sarvam yad bhr.gvan:giras iti. Aitareya Bra_hman.a 3.34 notes that Bhr.gu and the A_dityas emerged from the flames of the semen of Praja_pati and that An:girasas emerged from the coals (a possible play on the word, an:ga_ra) and that Br.haspati emerged from the rekindled 'coals'. Taittiri_ya Sam.hita_ (5.1.4.4) refers to Dadhya_n~ca A_tharvan.a (later known as Dadhi_ca Bha_rgava); and Pan~cavim.s'a Bra_hman.a (12.8.6) refers to Dadhya_n~ca of the An:girasas. Gopatha Bra_hman.a notes (1.1.4) that the first Atharvan became Bhr.gu. The association of Bhr.gus and Atharvans is noted from the following r.ca:

ते हि प्र॒जाया॒ अभ॑रन्त॒ वि श्रवो॒ बृह॒स्पति॑र् वृष॒भः सोम॑जामयः ।

य॒ज्ञैर् अथ॑र्वा प्रथ॒मो वि धा॑रयद् दे॒वा द॒क्षैर् भृग॑वः॒ सं चि॑कित्रिरे ॥

10.092.10 Inasmuch as Br.haspati, the showerer (of benefits) and the kindred of Soma (the Visvedeva_s), bestow food (for the support) of people, Atharvan was the first to invigorate (the gods) with sacrifices; with strength the gods and Bhr.gus discovered (the cattle). [With strength: i.e., with the strength acquired from the sacrifice which they had eaten; having gone to the sacrifice made by Atharvan, they discovered the cattle; cf. RV 1.83.5]. (cf. V.W. Karambelkar, The Bhr.gus and the Atharvans, *Journal of Indian History*, Vol. 26, Part II, pp. 107-119).

Atharvaveda is also known as Bhr.gvan:girasah because both Bhr.gu and Atharvaveda are associated with fire-priests Atharvans and An:girasas. It is notable that the compounds atharva_n:girasa and bhr.gvan:girasa are found in the Atharvaveda and not in the R.gveda (N.J. Shende, The R.gveda and Atharvaveda, *Journal of Asiatic Society Bombay*, Vol. 41-42, p. 56).

The five deities presiding over the sixth Manvantara, viz., the Ca_ks.us.a manvantara are: 1. A_dya_; 2. Prabhu_ta_; 3. R.bhu; 4. Pr.thuka; 5. Lekha_. To An:giras and Na_d.vala_ were born Uru and nother nine sons. Among the Saptar.s.is of the age are: Bhr.gu, Nabha, Vivasva_n, Sudha_ma_, Viraja_, Atina_ma_ and Sahis.n.u. Vis.n.u Pura_n.a notes that the original Pura_n.a was transmitted by Vya_sa to Romahars.an.a who in turn, taught it which contained 4,000 verses to six disciples including his son Ugras'ravas. The Atharvaveda refers to Pura_n.a and the three other Vedas:

r.cah sa_ma_nicchanda_m.si pura_n.am yajus.a_ saha ucchis.t.a_jjajn~ire sarve divi deva_ divis'ritah (11.7.24)

"The verses (r.c), the chants, the meters, the ancient (pura_n.a), together with the formula (Yajus.): from the remnant were born all the gods in heaven, heaven-resorters."

S'atapatha Bra_hman.a (11.5.6.8 and 13.4.3.13) refers respectively to itiha_sa pura_n.a and the recitation of the Pura_n.a. The Va_yu P., the Matsya P., and the Brahma_n.d.a P. were narrated in the reign of Adhisi_makr.s.n.a, the great-grandson of Pari_ks.it. The Va_yu P. was first recited to r.s.is who had gathered for a twelve-year yajn~a in the Naimis.a forest on the bank of the river Dr.s.advati_.

Su_tas were originally from the eastern regions of Magadha and Anu_pa (Pargiter, 1922, pp. 16-18).

"As seen by good people in the ancient times the su_ta's duty was to preserve the geneaologies of gods, r.s.is and glorious kings and the traditions of great men." (Va_yu P. 1.31-2). Again, according to Maha_bha_rata (1.63.2417) and Va_yu P. (60.11-12), the Vedas were arranged by Para_s'ara's son Kr.s.n.a Dvaipa_ya_na Vya_sa. The legend is that Vya_sa assigned to four disciples the compilations of the four Vedas: to Paila the R.gveda; to Vais'ampa_yana the Yajurveda; to Jaimini the Sa_maveda and to Sumantu the Atharvaveda. Va_yu P. (Ch. 60-61) and other Pura_n.as provide the following sequence of r.s.is and their work related to Vedic recensions:

“R.gveda. Paila made two versions and gave these to his disciples Indrapramati and Ba_s.kala. Ba_s.kala made four Sam.hita_s of his version and taught them to his four disciples Bodhya, Agnima_t.hara, Para_s’ara and Ya_jn~avalkya. Indrapramati’s Sam.hita_ passed to Ma_rkan.d.eya who taught it to his eldest son Satyas’ravas; he in turn taught it to his disciple Satyahita; he to his son Satyarata; he to Satyas’ri_. Satyas’ri_ had three disciples named S’a_kalya, Rathi_tara S’a_kapu_rn.a and Ba_s.kali_ Bharadva_ja; each of these established a separate s’a_kha_. S’a_kalya lost a debate with Yajn~avalkya, son of Brahmava_ha, at the court of King Janaka of Videha and as a condition of this debate he had to forfeit his life. S’a_kapu_rn.a Rathi_tara made three Sam.hita_s and also a Nirukta. He had four disciples: Ketava, Da_laki_, S’atabala_ka and Naigama. Ba_s.kali Bharadva_ja made three Sam.hita_s and he had three disciples Nanda_yani_ya, Pannaga_ri and Aryava.



“Yajurveda. Vais’ampa_yana made eighty six Sam.hita_s and all his disciples excepting Ya_jn~avalkya, son of Brahmara_ta or Devara_ta according to different accounts, received one each. These disciples were considered in three geographical groups: the northern, the middle and the eastern, the chiefs of which were respectively S’ya_ma_yani, A_run.i (or A_suri) ad A_lambi. They were called Carakas, Caraka Adhvaryus, or Taittiri_yas. Ya_jn~avalkya Brahmara_ti made his own Sam.hita_. He taught his version to his fifteen disciples: Kan.va, Vaidheyas’a_li_, Madhyandina, S’a_peyi_, Vidigdha, A_pya, Uddala, Ta_mra_yan.a, Va_tsya, Ga_lava, S’ais.iri, A_t.avi_, Parn.i_, Vi_ran.i and Sapara_yan.a Each of these made a different version; they were called Va_jins. Altogether, there were one hundred and one recensions.

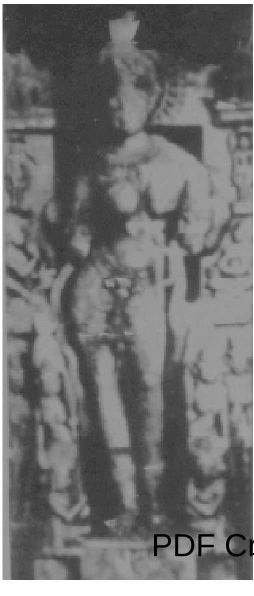
“ Sa_maveda. Jaimini’s grandson Sukarman made a thousand Sam.hita_s of it. Sukarman had two famous disciples: Paus.pin~ji and Hiran.yana_bha Kausalya. Paus.pin~ji’s disciples are called ‘northern sa_man chanters’ whereas Hiran.yana_bha’s are called ‘eastern sa_man chanters’. Paus.pin~ji had Lauga_ks.i, Kuthumi, Kus’i_tin and La_n:gali as his disciples. Lauga_ks.i had five disciples that led to schools such as Ra_n.a_yani_ya and Tan.d.iputra.

Kuthumi's three sons, the Kauthumas, formed their own schools. La_n:gali's disciples included Jaimini (the younger) and they also formed own schools.

"Atharvaveda. Here the succession goes from Sumantu to Kabandha and then to the schools of Pathya and Devadars'a. The Pathyas had three divisions, those of Ja_jail, Kumuda_di and S'aunaka; whereas Devadars'a taught four versions to Moda, Brahmabala, Pippala_da and S'aulka_yani. S'aunaka made two Sam.hita_s and gave one to Babhru and the other to Saindhava_yana. Saindhava gave that to Mun~jakes'a and it was again made into two." (Subhash Kak, 1994, *The astronomical Code of the R.gveda*, Delhi, Adiya Prakashan, pp. 68-69; cf. F.E. Pargiter, 1922, *Ancient Indian Historical Tradition*, London, pp. 322-325).



S'rutadevi, Deogarh; the presiding deity of the S'ruta, or the preaching of the Tirtha_n:karas and of the Kevalins. Jain pantheon describes the twelve an:ga texts (dva_dasa_n:gam) as limbs of S'rutadevata_ and the fourteen pu_rva texts are called her ornaments. She is associated with the lotus and swan.



Deogarh, ca. 5th cent. A.D. Sarasvati_ as a yaks.in.i_; she holds a chowrie in her right hand while the left hand rests on her left thigh. Inscription described her as yaks.in.i_ of Tirtha_nkara Abhinandana.



Sarasvati with swan (later periodl; after Indira S. Aiyar, opcit., pl. 10)

Miniature painting of Sarasvati_ in a

palm-leaf manuscript (Jn~a_tasu_tra and three other su_tras, Santinath Bhandar, Cambay), dated V.S. 1184 (1127 A.D.). Sarasvati_ stands in tribhanga pose; On her left is Subhankara and on her left Desala; both are offering prayers to the goddess with folded hands. A swan is shown in front. She holds lotus flowers in her two upper hands; a rosary and a manuscript in her two lower hands. The background of the painting is red; the goddess and worshippers are represented in yellow. Lake is shown in green. Blue is used to define the costumes.



Miniature painting on a palm-leaf manuscript (Orghaniryukti, collection of Upadhyayji Sri Viravijayaji Sastgrasamgraha, Chhani, Baroda; 227 folios; folio 1 representgs the goddess, 2”X2 ½”); V.S. 1218 (1161 A.D.). She has a lotus in the upper hand and a manuscript in the left lower hand. Other two hands play on the vi_n.a_. The body of the deity is in white; her mukut.a is in yellow; she wears a red bodice; the background is in red colour. The swan is shown. Canarese Digambara tradition follows the same form (Burgess, *Digambara Jain Iconography*, pp. 459 ff; cf. *Indian Antiquary*, Vol. XXXII). Agni Pura_n.a (Chapter 50) states that idols of Sarasvati_ in temples should hold in her hands book, string of beads and vi_n.a_.



Miniature painting on a palm-leaf manuscript (S’kavagapad.ikkaman.a Suttacun.n.i), Boston museum; V.S. 1317 (1262 A.D.). She holds a manuscript and a lotus on her right and left hands; and carries the vi_n.a_ on the remaining hands.

Jainas celebrate Jn~a_na Pan~cami in the month of Ka_rtika, s'ukla pan~cami, when Sarasvati_ is worshipped. [In the Indian tradition, the pu_ja for Sarasvati_ is held on pan~cami tithi in the month of Ma_gha; also called Vasanta Pan~cami; in some parts of India, the pu_ja is performed during the s'ukla paks.a, as.t.ami tithi of the month As'vina (September-October) as part of the Navara_tri celebrations. In the Jain pantheon, sixteen vidya_devis are worshipped. The goddess of learning is described as: Sarasvati_, S'rutadevata_, S'a_rada_, Bha_rati_, Bhas.a_, Va_k, Va_k-devata_, Va_gi_s'vari_, Va_gbva_dini_, Va_n.i_ and Bra_hmi_. She supervises knowledge of five types: mati- (common sense), s'ruta- (scriptural), avadhi- (supernatural cognition), manahparyaya (thought-reading), kevala (omniscience). Literary references are found in: Bhavati Sutra, Maha_nisitha Sutra, Pa_ks.ika Sutra, Dvadas'a_ran.yacakra, Pan~ca_saka, Samsa_rada_vanalastotra (of haribhadra Suri), Sarasvati_ Kalpa (of Bappaphatti Suri). Iconographically, she is associated with the manuscript, aks.asu_tra, reed-pen, vi_n.a_, swan and peacock.





Skanda as instructor god, brahma-s'a_sta_, 9th cent. A.D., Pratiha_ra, Delhi, National Museum Skanda holds a manuscript in his right upper hand; the spear emanates from the s'akti devion his left. The association of Skanda with Brahma may explain the association of peacock with both Skanda and Sarasvati_ icons in the Hindu iconographic evolution.

Devi_ru_pa_ Sarasvati_

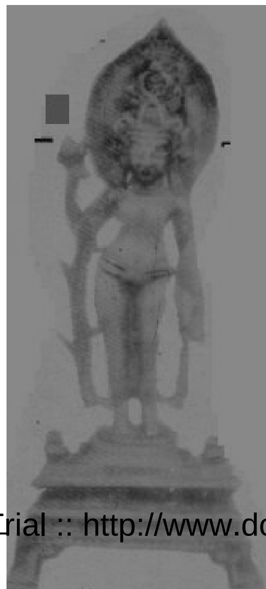
Kus.a_n.a, 2nd cent. A.D.; State museum, Lucknow. The early sculpture of Sarasvati_ was found in 1889 in the earthen temple in the mound at Kankali T.ila, Mathura. The goddess is squatting on a rectangular pedestal with her knees up, holding a manuscript in her left hand. The right hand is placed above the right knee. She is draped in a cloth. An attendant on the left wears a tunic

and holds a jar; an attendant on the right has his hands clasped in adoration. A siz-line inscrip;tion is found in Bra_hmi_ script (Kus.a_n.a period). The jar may symbolize the jn~a_nabha_n.d.a, the receptacle of knowledge and adored by the smith as representation of the goddess of arts and crafts and of learning.

The sculpture is dated to the s'aka era 54 (that is, 132 A.D.).. The inscription reads:

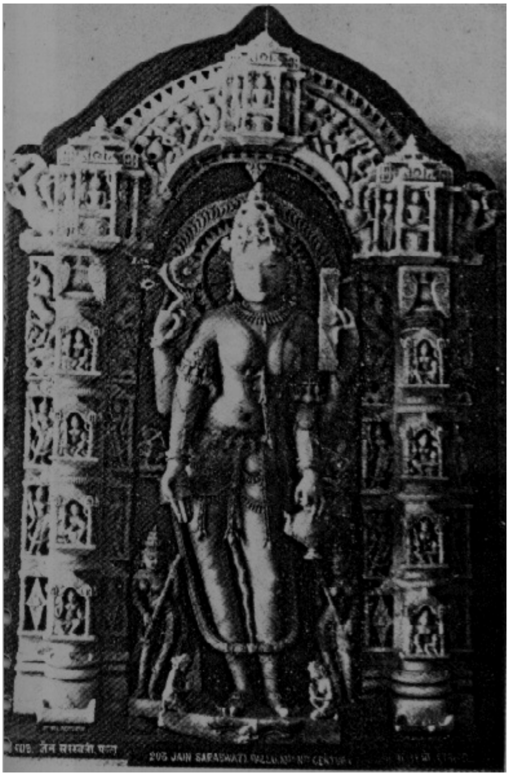
> **(sid.) dham sar LIV himant ama_se chaturtghe IV divase X a.**
> **sya purva_ga_m kot.t.iya_to (ga)n.a_to stha_ni (y)a_to kula_to**
> **vaira_to s'a_kha_to s'rigrih (a_) to sambhoga_to**
> **va_chakasya_rayya**
> **(h) astahestisya s'is.yo gan.i_sya aryya ma_ghahastisva**
> **a_rya devosya ninearttane govasya sihaputrasya lahikaka_rukasya da_nam**
> **sarvvasatva_na_m hitasukha_ eka_ sarasvati_ pratis.t.ha_pita_**
> **avatale ranga_narttano me**

Translation: Success; in the year 54 (?),. In the fourth, 4 month of winter, on the fourth day, on the lunar day specified) as above, one (statue of) Sarasvati_, the gift of the Smith Gova, son of Siha, (made) at the instance of the preacher (Va_chaka) Aryyadeva, the Sraddhachara of the Gan.in Aryya Ma_ghahasti, the pupil of the preacher Aryya Hastahasti, from the Kottiya Gan.a, the Stha_niya Kula, the Vaira_ S'a_kha_, and the Srigriha Sambhoga has been set up for the welfare of all beings.





Vasanthgad.h, Sirohi, Rajasthan; bronze assigned to post-Gupta period (S'a_rn:gadeva of Marudes'a school of



iconography, 7th cen. A.D.; cf. Ta_ra_na_tha)_. The crown has a disc on top and makara on either end. Two leaves hang on either side of the crown. She wears two necklaces, an eka_vali with a small pendant and an urah-su_tra. A long scarf is seen across the shoulders and reaches upto the ankles in two wavy lines. She holds the lotus in her right hand and a manuscript on her left hand. She stands on a lotus and two vases are placed on either side of the lotus. The eyes of the are inlaid with silver.

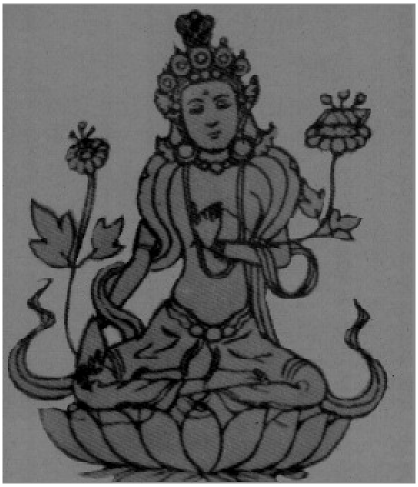
Sri_ Vidya_ Sarasvati_. White marble, Pallu, Bikaner, Rajasthan; Cauha_n, 12th cent. A.D.; Delhi, National Museum; in tribhan:ga pose, Sarasvati_ stands on a lotus; clockwise, she holds a rosary, a lotus, a palm-leaf manuscript, a

spouted Kaman.d.alu (vase of knowledge). She wears a head-dress and ornaments. She is flanked by two female figures carrying vi_n.a_s in their hands. The donor and his wife are near the feet of the goddess in adoration. A tiny swan is depicted on the base in front. A Tirtha_n:kara is seated in meditation and is seen above the head of the deity.



Prabha_toran.a has Jaina divinities sculpted; Cauha_na, 12th cent. A.D.; Pallu, Bikaner, Rajasthan; Bikaner museum.

Mathura, Sarasvati_ with swan as her va_hana; British museum.



Prajn~a_parimita_ was the goddess of wisdom in the Buddhist pantheon. Buddhist iconography depict Sarasvati_, as Prajn~a_parimita_, as a two-handed goddess or as a form with three faces and six arms. The forms are described as follows: (1) Maha_sarasvati_. Rests on the moon over the white lotus, with a gift-bestowing gesture (varada mudra), carrying, in the left hand, a white lotus with its stem. She is smiling and compassionate. She is decked in many ornaments and appears to be a maiden of twelve years with half-developed breasts. She surrounds herself with four goddesses, as facets of herself: Insight (prajn~a_), Dexterity (medha_), Memory (smr.ti) and Intelligence (mati). (2) Varavi_n.a_ Sarasvati_. She carries the Vi_n.a, lute, in her two hands and plays on it. (3) Vajras'a_rada_ (Autumnal Deity). She wears a crescent on her crown; she has three-eyes, two arms, carries the manuscript in her left hand and a lotus in her right hand. (4) A_ryasarasvati_. As a maiden of sixteen, she is white-complexioned, carries, in her left hand, a lotus stalk on which rests the Prajn~a_parimita_ book. In one form, called Vajrasarasvati_, she has three faces, stands on a red lotus, she is red in colour, with right face blue and left face white. In her three right hands, she carries the lotus on which rests the

Prajn~a_parimita book, the sword and curved blade; and in the three left hands, she carries the skull bowl of Brahma_, the jewel and the wheel. It is remarkable that in this form, Sarasvati_ carries two weapons, the sword and the curved blade, a clear reminiscence of the bronze age civilization nurtured on the banks of he Sarasvati_ river. (B.Bhattacharya, *The Indian Buddhist Iconography*, 1958, Firma KL Mukhopadhyaya).



The dhya_na describes Maha_sarasvati_ as follows:

The worshipper should think himself as goddess Maha_sarasvati_, who is resplendent like the autumn moon, rests on the moon over the white lotus, shows the varada mudra in her right hand and carries in the left the white lotus with its stem. She has a smiling countenance, is extremely compassionate, wears garments decorated with white sandal flowers. Her bosom is decorated with the pearl-necklace, and she is decked in many ornaments; she appears a maiden of twelve years and her bosom is uneven with half-developed breasts like flower-buds; she illumines the three worlds with the immeasurable light that radiates from her body. (*Sa_dhanama_la_*, p. 329).



Vajravi_n.a_ Sarasvati_ is also white in complexion, and peaceful. She holds the vi_n.a_ in her two hands and seen playing on it. She may also be accompanied by the four divinities: Prajn~a_, Medha_, Smr.ti and Mati.



Presiding deity of Vidya_-mandira established by Bhoja, the ruler of Parama_ra dyanasty of Dha_ra_, Ma_lawa (who reigned from 1018-10060 A.D. The king is said to have founded a Sanskrit College within the temple dedicated to Sarasvati_.) Now displayed as Stuart Bridge Collection (No.84); British Museum. Parama_ra, 1034 A.D. with a late na_gari inscription. She is standing in tribhanga pose, is bejewelled; has four arms; a garland is held in her left upper hand and a manuscript is held in her left lower hand. Five ji_nas are carved seated on the upper part of the black slab; an apparent indication that the image depicts the Jaina goddess of learning. On the base are two female attendants and a squatting worshipper on either side; to the right, a male and to the left, a female, perhaps representing the donors. The base of the image has an inscription in na_gari mentioning that it was made by the sculptor Manthala in 1034 A.D. She is stgated to be the protectress of the sixth Ti_rtha_nkara Padmaprabha. The eight anklets worn on her two ankles are reminiscent of the anklets worn by the bronze image unearthed in Mohenjo-daro dated ca. 2750 B.C. The inscription is read byh KN Dikshit (ASI) as follows: “On Sri_mad Bhoja narendra chandra nagari_ vidyadhari (?) romonadhih nama Sa* Sma* khalu Sukham (pra* pya na) ya_ psara_h Va_gdevi_ (m) pratima(m) vidha_ya janani yasya_-rjji (tanam

trayi)***phaladhika_m dhara (sarin) murttim subham nirmmame iti subham//sutrodh ra-sahira-suta mana thalena ghatitam//vi tika sivadevena likhitam iti san 1091" (Translation: Om the Vidyadhari of the town Bhoja, the moon among kings** having first made the mother goddess speech*** great in fruit*** created the auspicious image. This was made by Manathala, the son of the craftsman Sahira. Written by Sivadeva, in the Samvat year 1091).

A_ryasarasvati_ is a maiden of sixteen, with a white complexion. She carries in the left hand the stalk of a lotus on which rests the prajn~a_parimita_ book. She holds in her right hand the red lotus. The sa_dhana of A_ryasarasvati_ is expected to confer upon the sa_Dhaka, prajn~a_ (wisdom), medha (memory) and buddhi (intelligence). In this form, Sarasvati_ is associated with Man~jus'ri_, the first Buddhist Bodhisattva.



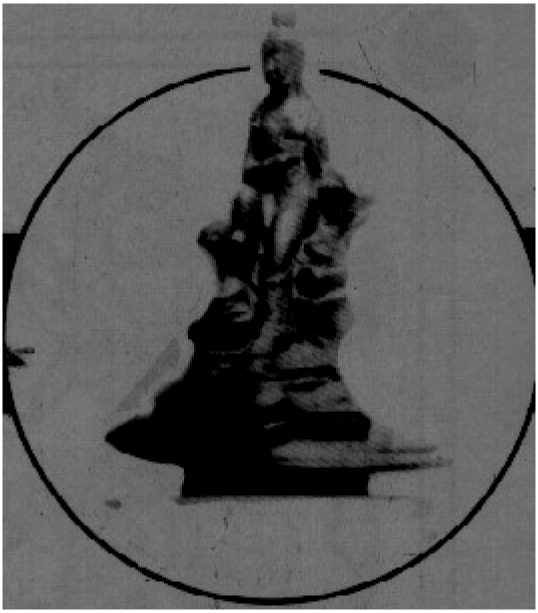
Vajras'a_rada rests upon a white lotus. Her crown is decorated with a crescent. She has three eyes and two hands. She holds a book in her left hand and a lotus in her right hand.

Vajrasarasvati_ is depicted with three faces and six arms. She is in pratya_li_d.ha pose. The dhya_na describes her as red in colour, with the right and left faces in blue and white colours respectively. She carries the lotus with the prajna_parimita_ book, a sword, a kartri, and on her three left arms: kappa_la of Brahma_, jewel and cakra.



Buddhism in Japan calls Benten or Dai-ben-Zai-ten as the Great Divinity of Reasoning Faculty. She is believed to confer power, happiness, riches, long life, fame and reasoning powers. She is the only female deity among the seven gods worshipped for good luck. Also known as Ben-Zai-ten, Benten-Sam, Koko-kuten, Kion-ten, the goddess is accompanied by a dragon and a white snake. [cf. the depiction of a curving snake as the representation of water symbol in Avestan lore]. The legend associated with goddess Benten: "Once upon a time there was a monstrous dragon that devoured all the children who

lived in the neighbourhood of the Cave where he dwelt. A violent earthquake took place and the goddess Benten appeared on a cloud. From the water suddenly emerged that island 'Enoshima', and the goddess Benten, descended to the island, married the dragon and put an end to his ravages. Benten had fifteen children. Their names were: Aikio, Hanki, Hikken, Guiba, Inyaku, Jusha, Keisho, Konsai, Kwantai, Sanyo, Sansha, Shusen, Shoma, Touchiu, Zensai." (Niranjan Ghosh, Sri Sarasvati_, Delhi, Satguru Publications, 1984, p. 63).



Happi Benten is eight-armed. She holds in her arms: vajra, sword, cakra, pa_s'a, paras'u, bow and arrow. When depicted with two hands, Benten is bedecked with ornaments and holds biwa or vi_n.a_ in her arms. The temples of Benten in Japan are situated near big ponds, rivers and seas. One temple is near Uyeno, Tokyo near the Shinobazn pond. Benten has temples in the islands of Yenoshima, Chakubushima and Miyajima..



A_ryasarasvati_ is seen on a sculptured gallery of Cave 10 at Ellora. She is with Avalokites'vara standing on an unfinished padma or lotus. Standing in the samabhanga pose, her right hand is in the varada mudra. Her right hand holds the stalk of a padma with a manuscript at the shoulder level. She wears a jat.a_mukut.a, karn.akund.ala, graiveyaka, keyu_ra and kan:kan.a. Her sari is held by a kamarabandha. A devotee is between the two sculptures seated with folded hands.



Ceiling of Vimala-vasahi, Mt. Abu; Sarasvati_ holds the lotus and a manuscript in her two upper hands; a rosary is held in the open palm held in varada mudra and a kaman.d.alu is held in the lower hand. Swan is also depicted.

Pa_li Culavam.sa records that king Parakkamaba_ha built a palace called Sarassotiman.d.apa; the man.d.apa was devoted to arts and music and was adorned with frescoes. (Pa_li *Kulavam.sa* LXXXVI, 83; *Ma_lala Sekhara's Dictionary of Pali Proper Names,* Vol. II, p. 1074).

The Tibetan Buddhist tradition also gives the pride of place to Sarasvati_ in the form of three Insight (prajn~a_) deities: Man~jus'ri_, Sarasvati_ and (white) Acala_. The Sarasvati_ section of the collection, *Sgrub thabs kun btus*, occupies about 150 folios (Folio Nos. 394-546). Folio 524 cites the Prajn~a_s'ataka: "Prajn~a_ is the root of all merits, whether seen or unseen. Since it accomplishes both, first one should endeavor to promote insight…Among the numerous means for promoting insight, the one that is best is the reliance on Devi_ Sarasvati_" . Folio 444 calls Sarasvati_ the wife of the Gandharva Tambura. Tambura may be a reference to the tumburu-veen.a_. Folio Nos. 520-3, 4, refer to Sarasvati_ as a "messenger of Sa_la". This epithet of the Tibetan sa_dhanas is an enigma. If sa_la refers to a workshop, as in Sanskrit, this epithet of Sarasvati_ may be a reminiscing of the bronze-age nurtured on the banks of the Sarasvati_ river.

The white Sarasvati_ of the Brahmin Ki_la (Tibetan name: Bram ze phur bu) school is called, 'Brahma's daughter'…The Sarasvati_ in the lineage from Bo-doln: pan.-chen phyogs-las-rnam-rgyal makes her an emanation from Vis.n.u (Tibetan: khyab' jug).". (*Sgrub thabs kun btus*, Vol. Kha, 1970, Dehradun, GTK Lodoy, N. Gyaltsen and N. Lungtok).

Sarasvati_ is referred to as Brahma's daughter in Va_mana Pura_n.a (23.13):

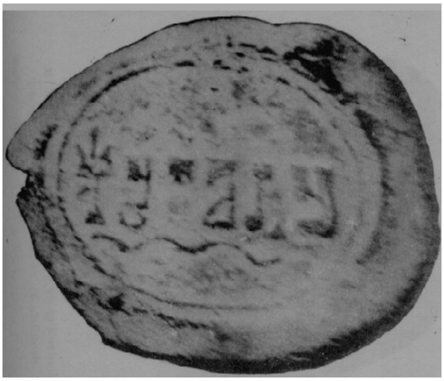
tatra devi_m dadars'a_tha pun.ya_m pa_pavimocini_m
plaks.aja_m Brahman.ah putri_m harijihva_m sarasvati_m

A Maha_ya_na scripture popular in Tibet and China, Suvarn.aprabha_sa-su_tra, devotes a chapter to Sarasvati_ setting forth her sa_dhana, together with the rite of expanding insight (parjn~a_) and cognition (buddhi). (cf. Ferdinand D. Lessing and Alex Wayman, *Mkhas grub rje's Fundamentals of the Buddhist Tantras*, Mouton, the Hague, 1968, p. 111). "…the powerful goddess personality of Sarasvati_ that had developed in the Vedic period continued unabated through the many centuries, even though the iconographic details varied. Despite the adaptation of the goddess to later tantric meditation procedures, the goddess's ability to promote insight and inspiration did not suffer serious detraction even when she advanced from twelve to sixteen years." (Alex Wayman, The Goddess Sarasvati_--from India to Tibet, in: *Buddhist Insight*, Delhi, Motilal Banarsidass, 1984, pp. 431-439).



An early representation of Sarasvati_ in association with water (and the rimmed jar), is seen on a circular seal discovered at Bhita, Allahabad. A vase (bhadra ghat.a) is shown on a pedestal below which an inscription in Gupta Bra_hmi characters reads: SARASVATI_. Apparently, the vase containing water is an emblemic representation of the goddess. (Gupta period). It is said that Sarasvati_ is also represented during the Gupta period on the reverse of the Lyricist type of Samudragupta's gold coins. Sarasvati_ is shown seated to left on a wicket stool, wearing a loose robe, close-fitting cap and jewellery. The vi_n.a_ on the obverse identifies her as Sarasvati_. Sarasvati_ is also represented on the reverse of a Ra_jalila_ type of coins of Sama_cha_radeva (ca. 550-575 A.D.), a predecessor of S'as'a_nka of Gand.a. The goddess stands in a tribhanga pose on a lotus and holding a lotus on her left hand and is smelling another lotus with her right hand. A swan is to her right. (J.N.Banerjea, *Development of Hindu Iconography*, p. 378). A gold coin dated to 6^{th}-7^{th} cent. A.D. of the Gupta style (Calcutta, Indian museum) depicts a lotus and a swan (or peacock, according to Smith) and the goddess on the reverse is therefore, identified as Sarasvati_. (J.N.Banerjea, JISOA, IX, 1941, p. 137). The Pehowa

(Pr.thu_daka) pras'asti of Mahendrapa_la contains an invocation to the river Sarasvati_ and the region around it. (*Epigraphic Indica*, I. P.245, verse 4). A seal discovered at Daulatpur (near Kuruks.etra) bears the legend stha_nes'vara and below the inscription is a curved line like a serpent which probably represents the Sarasvati_ river.



Daulatpur (Kuruks.etra). Clay seal with the legend: S'ri_ Stha_nes'varasya (After Swami Omanand, in: Parmanand Gupta, 1989, *Geography from Ancient Indian Coins and Seals*, New Delhi, Concept Publishing Co., Plate 3).

A figure of Sarasvati_ is carved on the snout of the grey sandstone image of a massive boar (No. 84) from Andhai, District Lalitpur. The goddess plays on the makara vi_n.a_ while the A_divara_ha is rescuing the earth.



Sarasvati_ personified as river goddess with apsaras pouring water from the heavens; Cave no. 29, Ellora; Va_ka_t.aka, 5th cent. A.D. [In Cave 6 (Maharwada) of Ellora, there is a female figure with a peacock on her left, a male figure is seen reading; an apparent representation of Sarasvati_ as goddess of learning; on the wall at the south entrance of Cave 8, there is a sculpture of Sarasvati_; descending to the court of Cave 16 by the south staircase, a cave about 37X15

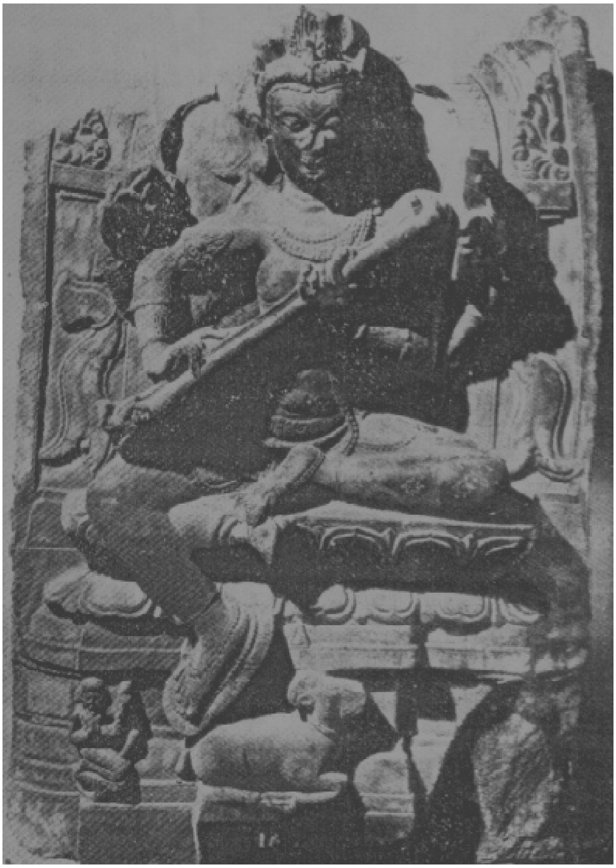
feet has trwo square pillars and pilasters in front; on the backwall, there is a figure of Sarasvati_ holding a rosary].



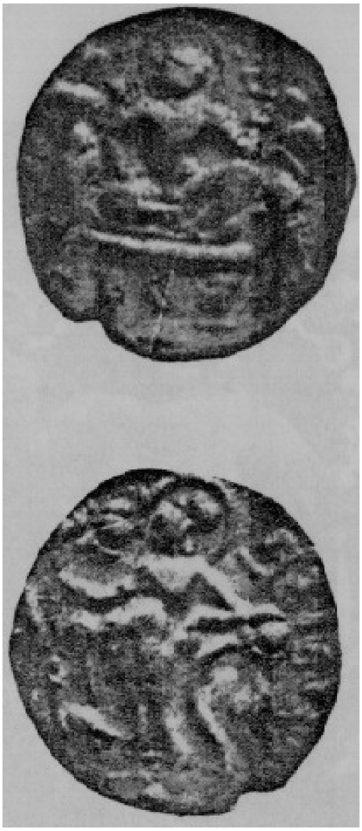
Sarasvati_ personified as river goddess; Ellora, Kaila_sa temple, ra_s.t..raku_t.a, 8^{th} cen. A.D.; in tribhanga pose, the goddess is standing on a lotus amidst foliage and creeper. Two other personified river goddesses, Gan:ga_ and Yamuna_ are also seen.



Bronze; Sarasvati_ plays on the vi_n.a_ held in her lap; she is flanked by two male figures playing on a flute and cymbals. A swan is depicted in front on right; the halo has a flaming border; Pa_la, Nalanda, Bihar, 9^{th} cent. A.D.; Delhi, National Museum.



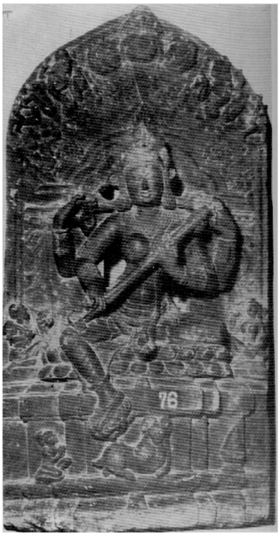
Sarasvati_ seated on a double-lotus seat; she holds a rosary and a manuscript in her upper hands; her lower hands play on a vi_n.a_. A ram is shown as her mount. Pa_la, 10th cent. A.D., Gaya, Bihar; Delhi, National Museum.



Coins of Sama_ca_radeva, 6th cent. AD; image of Sarasvati_; Calcutta, Indian Museum.



Sarasvati_, Kalanja, Bogra, Museum of Varendra Research Society, Bangladesh; 12th cent. A.D. with ram as her va_hana.



Sarasvati_, Chatingram, Bogra, Museum of Varendra Research Society, Bangladesh; 11th cent. A.D. with ram as her va_hana.



Sarasvati_ has a vi_n.a_ held in her hands; she wears a diaphanous sari secure with an elaborate girdle



(mekhala_). Pa_la, 10th cent. A.D.; 24 Paraganas, Bengal; Calcutta,



As

Sa rosary and a

m upper hands and

pl held in her lower

ha found in Suhania

an urjara-Pratiha_ra period, 9th cent. A.D.; Gwalior museum;. La i_; seated on a lotus; holds a rosary and a manuscript (p pper hands; lower right hand is in varada mudra_; the left ha n.d.alu; wears jat.a_mukut.a and ornaments; Parama_ra, 11 i, National Museum.



Sarasvati, Bagd.i.

Lalita_sana Sarasvati_ playhing on vi_n.a_; in her lower left hand she holds a manuscript (upper right hand is broken); In front are depicted a swan and two adoring devotees; Ga_had.ava_la, Gorakhpur, Uttar Pradesh, 12th cent. A.D.; Lucknow museum.





Sarasvati_ in a dancing pose; her right foot is placed on the ground and her left foot is raised and bent at knee. She is under a mango tree, carrying a rosary, a goad, a manuscript and a vi_n.a_ and exquisitely ornamented. Hoysal.a, 12th cent. A.D.; Kes'ava temple, Somanathapur, Karnataka.



Sarasvati in a dancing pose; she holds a rosary, goad, lotus, noose, manuscript and vi_n.a_ in her hands. She wears a high bejeweled crown is bedecked in ornaments. She is attended by a female cauri_ bearer on either side; a swan is depicted near her right foot. Hoys.ala, 12th cent. A.D., Hoysales'vara temple, Halebid, Karnataka. In Horsales'vara temple at Udaypur (Madhya Pradesh, Parama_ra, 11th cent. A.D.), Sarasvati_ is represented with Nat.ara_ja and dancing Pa_rvati_.



Two-armed pus.t.i, a consort of Vis.n.u holds a vi_n.a_ in her hands; Ga_had.ava_la, Gorakhpur, Uttar Pradesh, 11th-12th cent. A.D.; Lucknow museum [RV 4.3.7 associates Sarasvati_ with pus.t.i (nourishment); cf. pus.t.ika_ = oyster. Taittiri_ya Sam.hita_ (2.4.6.2) equates Va_k, Sini_va_li_ and Pus.t.i; Taittiri_ya Bra_hman.a (2.5.7.4) calls Sarasvati_ the mistress of pus.t.i (pus.t.ipatni_)].



Sarasvati_ is seated on a double-lotus; she has four arms; she wears a jat.a_mukut.a, a crescent-shaped necklace, sacred thread and sari held with a girdle. Chola, Vijayanagara, Tamilnadu, 13th-14th cent. A.D.

Section 8 Concept of Cyclical Time

The concept of time in the Indian tradition is not a straight flowing phenomenon but cyclical time, in harmony with the cycles of motion of the planets.

The Indian Tradition holds that the Great Epic, the Maha_bha_rata is a direct product of the Vedicheritage. While many past attempts made at absolute chronology of Rigveda have bristled with problems in interpreting the r.cas and the reliability of the evidence provided in the Pura_n.a, (comparable to the difficulties faced in deciphering the inscriptions of the Sindhu Sarasvati River Basin Civilization), astronomical data furnished in ancient texts and epigraphs have been used in charting out new directions to resolve the chronology problem.

Prof. Narahari Achar (University of Memphis, USA) has produced a vivid computer-generated (using astronomical computational software) picture of the skies near Delhi on August 16, 2927 BC is presented in his path-breaking article in: http://www1.shore.net/~india/ejvs/issues.html

Skies near Delhi on August 16, 2927 BC

The picture is a sky map or this date depictc kr.ttika_-s (actually, *just eta-tauri*) rise exactly in the east, as noted in the S'atapatha Bra_hman.a text:

> **krr.ttika_sv agnI a_dadhi_ta / eta_ va_ agninaks.atram:yat**
> **kr.ttika_h / tad vai saloma yo agninaks.atre agni_**
> **a_dadha_tai / tasma_t kr.ttika_sv a_dadhi_ta //**
> (II. 1. 2.1; Section: naks.atra bra_hman.a)

"He may set up the two fires under kr.ttika_-s; for they, the kr.ttika_-s are doubtless

Agni's asterism, so that if he sets up his fires under Agni's asterism, (he will bring about) a correspondence (between his fires and the asterism): for this reason he may set up his fires under the kr.ttika_-s" (tr. Eggeling [5]) .

"However, in 2927 BC, it can be seen in figure 6 [delhi6.gif], that Thuban is the pole star (later on called dhruva)and that all members of the saptarSis are circumpolar and are quite to the north. Hence the saptars.is would neither rise nor set. We have verified that the saptarSis remain circumpolar at Delhi from about 4500BC to about 100 BC, at which time only one star of the group, eta-Ursa majoris, becomes non-circumpolar and rises and sets. It is only at about 600 AD that a second member of the group becomes non-circumpolar at Delhi. If they are all circumpolar as seen in Delhi at about 3000 BC, what is the meaning of "they rise in the north"? In order to see at least one of them rise and set, one would have to observe from a place south of Delhi. In fact, beta-Ursa-majoris, (declination: +66 degrees 8 minutes) could be observed as rising or setting from a place whose latitude is about 24degrees N, compared to Delhi's 28 degrees 22 minutes N. One would have to be at latitude of about 10 degrees N to observe all of saptars.is to rise and set. Then what is the real meaning of amI hy uttara_hi saptarsayah udyanti pura eta_[h] (S'B II.1.2.4)? Eggeling translates it as "for the latter, the seven r.s.is, rise in the north, and they (the kr.ttika_s) in the east." We feel that the confusion arises because, "udyanti" is associated with both "saptarSayaH" and "etAH." The sentence should be broken as AmI hy uttarAhi saptarSayaH / udyanti pura eta_h, associating udyanti with eta_h only. The first part would simply state "amI hy uttara_hi saptars.ayah (santi)". As sa_yan.a explains, 'a_hi ca du_re', (PS 5.3.37) iti. –a_hi is a pratyaya, uttara_hi would mean 'du_rades'e uttaradigbha_ge' 'at a far off place in the north'. Thus, S'B (II.1.2.4) would mean "for these seven r.s.is indeed (stay) far to the north and they (the kr.ttika_s) rise in the east." There is even a hint of the circumpolar nature of the saptars.is, by the absence of 'rising'!" (B. N. Narahari Achar, 1999, On Exploring the Vedic Sky with Modern ComputerSoftware, EJVS, Vol.5,2)
http://www1.shore.net/~india/ejvs/ejvs0502/ejvs0502.txt

The absolute dates of the Maha_bha_rata war and the Kali Yuga_di (the start of the Kali Era) have been discussed by some scholars using astronomical observations as check-points.

One such effort made in 1969, is introduced by Prof. K. Srinivasa Raghavan as follows:

"I have gone carefully through all the essays of the occidental and oriental scholars in determining the date of the Maha Bharata War. Those scholars have variously fixed the date ranging from 1919 BC to 315 BC. Most of their ideas are empirical and not a few of them are the product of fanciful imagination or pre-conceived notions. It is now possible dispassionately to determine the correct date with a high degree of accuracy, and this is based on astronomical data and the internal evidence of the Maha Bharata alone. We may in fact justly and properly style the date of the Maha Bharata war, which the science of astronomy has now incontrovertibly fixed on 22nd Nov. 3067 BC, as the true anchor sheet of Indian chronology and history, as every date indicated by Indian astronomy and supported by Ancient Indian Puranic history depends on it". (Prof. K. Srinivasa Raghavan, 1969).

Prof. Srinivasa Raghavan, using Indian ephemeris and the Indian astrological tradition, computes the date of the Mahabharata war absolutely on 22nd Nov. 3067 BC:
http://sarasvati.simplenet.com/datemb1.PDF

The correct apparent position of the planets on the midnight of Sat/Sun, 10/11 Jan. 3104 BC

Mercury	298deg.058'
Venus	298deg. 016'
Mars	299deg. 025'
Jupiter	299deg. 010'
Saturn	299deg. 005'
Rahu	230deg. 022'

That is, at 1 AM on the 10th Jan. 3104 BC the planets were seen rising clustered together at Mid Sravishta, with the crescent Moon. (The difference in longitude between the planets and the sun is about 150 or one hour). Hence, Sunday, 11th Jan. 3104 BC the Magha Sukla Prathama of Veda Vya_sa is the beginning of the astronomical Kali Yuga Era.

Prof. Narahari Achar noted, after simulations using the computer software: "The simulations show the clustering of the planets; mercury is on one side at an angle of about 17*. On the other side of the sun all other planets are clustered within about the same separation of 17*, except for venus which is about twice as far away. Still, I think it is as good a verification as one can get." (Personal communication dated 8 September, 2000).

The Maha_bha_rata refers to an unusual sequence of eclipses; the dates are computed by Prof. Srinivasa Raghavan as follows:

The field sacrifice at Kurukshetra was on 13 Oct. 3067 BC. New Moon - 601488 Julian day - Sunday 0.25, with the sun and moon at 224.89 and Rahu at 219.74. It was a solar eclipse day with the eclipse at Midday.The previous full moon was on 28 Sept 3067 BC 601473 Julian day - Saturday 6.51 with the sun at 2100.32 and Moon at 300.32 and Rahu at 2200.55. It was a lunar eclipse day, with the eclipse immediately after sun set (moonrise).

Prof. Narahari Achar has compiled the maps of the Delhi skies on these dates, confirming the computations of Prof. Srinivasa Raghavan.

Skies near Delhi on September 28, 3067 BC (Full Moon Day) The moon is near krittika, and saturn is in beautiful conjunction with Rohini

Skies near Delhi on October 14, 3067 BC (New Moon Day) Moon is near jyeshtha

Hindu Astronomy: Bra_hman.as are dated to ca. 3000 BC

"The Vedic Period. The history of Hindu Astronomy goes back to a very ancient period. Evidence of the astronomical knowledge of the Brahmans is found in the Vedas. Even in the age of the Mantras it was known that the Moon returns to its position among the stars once in 27 days. Each day it was

observed to be in conjunction with a single star or group of stars, and the day was designated by that asterism. Thus arose the later division of the ecliptic into 27 asterismal segments. They knew that once in about 29 ½ days the Moon is in conjunction with the Sun and this period they used as the measure of their month. (The word ma_s means (i) the month, (ii) the Moon, and (iii) a measure). They knew that the solar year marked by the cycle of the seasons consists of 36t days and that this is in excess of 12 lunar months by about 11 days. The months were named after the asterisms at or near which the moon became full, like Pha_lguna, Chaitra etc. The shortest days were noted to be when the noon-sun was low down in the sky at Winter Solstice (W.S.) and the days were noted to become longer as the Summer Solstice approached. The year began with the first day of the light fortnight of the month Pha_lguna near the W.S. During the age of the Bra_hman.as it was observed that the Pleiades (Krittika_s) rose due east, and this fact was used in the orientation of the sacrificial halls. (From this we can compute the age of the observation to be about 3000 BC). Professional star gazers called naks.atra dars'as are mentioned and in the Cha_ndogya Upanis.ad a lore of stars called Nakshatra-vidya_, is mentioned. The planets Jupiter and Venus were known. The Atri family was credited with the knowledge of eclipses.

"The Immediate Post-Vedic Period. The astronomical knowledge of this period is found in the Veda_n:ga Jyotisha (V.J.) of Lagadha which is the most ancient Hindu astronomical work extant. This deals with the computation of the ending moments of the Tithi and Nakshatra, the Sun's Nakshatra etc ., things usually found in the Almanacs, useful for the performance of the Vedic sacrifices...The V.J. says that the winter solstice began with the sun at the asterism Sravisht.ha_, from which we can calculate the date of the work to be about 1200 BC. Close upon the V.J. followed several other works, the Garga Samhita_, the Paita_maha Siddha_nta, the Su_rya Prajn~apti, the Jyotishakaran.d.a, the Ka_la_loka Praka_s'a etc., all of which dealt only with the mean motions of the Sun and the Moon, like the V.J."(Kuppanna Sastry, T.S., 1989, *Collected Papers on Jyotisha*, Tirupati, Kendriya Sanskrit Vidyapeetha, pp. 451-459).

Determination of the Date of the Maha_bha_rata

"Hindus generally believe that the story of the Maha_bha_rata (MBh.) is a narrative of events that actually happened, and they all took place near the end of the Dva_parayuga and the beginning of Kaliyuga...The popular view is that

Dva_para ended and Kali began at the time fixed for it by the astronomical siddha_ntas, 3179 years before the S'a_ka era of 78 A.D., which corresponds to Friday, 18th February, 3102 BC, sunrise, or the previous midnight according to some schools. (A_ryabhat.a does not give the exact time but merely states that 3600 years of Kali had ended when he was twenty three years of age)...Excepting the time of the year when the war might have happened, there is nothing in the Maha_bha_rata to fix the year definitely. We do not have adequate data to fix either the happenings or when the work, even part by part, was written." (Kuppanna Sastry, T.S., 1989, *Collected Papers on Jyotisha*, Tirupati, Kendriya Sanskrit Vidyapeetha, pp. 318-328).

Astronomy as aid to history

"In this 7th Manvantara, our ancient progenitor was Emperor Vaivasvatha Manu whose date was 8576 BC. This is borne out by astronomical data. It was this Manu who propagated the first calendar of the World of Saptha Rishi Era. The fixation of dates as per astronomical data is simple enough. In 1979, we note that the Saptha Rishi (Ursa Major, the Seven Stars) is in Hastha Nakshatra with a backward movement. It is now in the 25th Nakshartra from Maga Nakshatra and is further in the 55th year as per the following calculation. There are 27 stars in the Zodiac. Ursa Major takes 100 years to traverse one star. The stars are constant. So, one full revolution of Saptha Rishi over the 27 stars takes 2700 years. We have had till now three full revolutions so far from Manu's time. 2700 X 3 = 8100. If we add to this 24 X 100 = 2400 years we get 10,500 years. Manu's date is fixed by the position of Saptha Rishi in his days calculated backwards from the acknowledged Kali Yuga date 3104 BC. If we add 1979 to 8576 BC, we get 10585 years, which will figure out as the period now in Kali from Vaivasvatha Manu's coronation date (8576 BC). As it is universally accepted that Kali began in 3102 BC, only two revolutions or Ursa Major will do to reach the Vivasvatha Manu Date of 8576 = 2700 X 2 + 3102 + 74. There is, however, a precession in the movement of Equinox at the rate of 72 to 75 years per degree. This has been overcome by the periodical revision thereof by celebrated astronomers as Vis'va_mitra in 7000 BC, Paras'ura_ma in 4100 BC, Vedavya_sa in 3100 BC, Vr.dha Garga in 1400 BC and lastly in Su_rya Siddha_nta in 300 AD. Prof. K. Srinivasa Raghavan has made the calculation up-to-date till 1978...

> Vaivasvatha Manu coronation 120^0 Magha (Nakshatra) 300^0 Autumn (Equinox) 8576 BC

Sri Rama's Birth 68^0 Arudra (Nakshatra) Dhanis.t.a 248^0 Moola (Equinox) 4439 BC
Sri Krishna's birth 48^0 Rohini (Nakshatra) 228^0 Jyes.t.a (Equinox) 3312 BC
Maha_bha_rata War 22 November 3067 BC
Astronomical Kaliyuga 11 January 3104 BC
Ascension of Krishna 13 April 3031 BC"

(Ramachandran, V.G., ed., 1982, *A Peep into the Historic Past: Seminar Papers*, Madras, International Society for the Investigation of Ancient Civilization, 31, Poes Garden, pp. 10-11).

Chronology

The tradition in the Pura_n.as use the following reference dates:

3077 BC: the death of Yudhis.t.hira (MBh: *Maha_prastha_nika Parva*, I), in the 25th year of the Kaliyuga

3102 BC: the advent of the Kaliyuga with Kr.s.n.a's death

3138 BC: the year of the Bha_rata war and Pariks.it's birth
The belief is that the kaliyuga began 36 years after the Bharata war and in that year, Kr.s.n.a left the earth for his heavenly home. The pa_n.d.avas are stated to have lived at the juncture of dva_para and Kaliyuga (A_di: 2/13); a s'loka also notes that kaliyuga was to commence very soon (Vana: 149/38: **etat kaliyugam na_ma acirat yat pravartate**—the kaliyuga which will commence very soon).

3177 BC: the year in which the Sapta R.s.i man.d.ala, the Seven R.s.is, the stars of the constellation Great Bear, are said to have entered the naks.atra (lunar asterism) Magha_ in the course of a cycle of 27 centuries supposed to be running through the 27 lunar asterisms of the ecliptic by a stay of 100 years in each of them.

(*Va_yu Pura_n.a* 90.423 and the *Brahma_n.d.a Pura_n.a* 2.24.234 note that the Seven R.s.is who were in the Magha_ at the time of Pari_ks.it will be in the 24th century in a part of the A_ndhras (a_ndhra_m.s'e), which can be construed as the 24th century having at its end the A_ndhras. This means that 2400 years elapsed after 3177 BC when the A_ndhra dynasty had started, i.e. around ca. 777 BC.)

The Pura_n.ic passage referring to the intervening period between the birth of Pari_ks.it and the accession of Maha_padma Nanda as 1015 or 1050 or 1500 years (Pargiter, *Puranik Texts of the Dynasties of the Kali Age*, p. 58; Raychaudhuri, *Political History of Ancient India*, 4th edn., pp. 25-26) indicates clearly the tradition of time reckoning with reference to the important historical event of the Mah_bha_rata war. (The Aihole inscription of 634 AD (Epigraphic Indica, Vol. VI, p. 7; the Aihole inscription of Ca_lukya Pulakes'in II of Ba_da_mi was incised on the expiry of 3735 years after the Bha_rata war and 556 years of the S'aka kings. This means 3179 years are added to the expired S'aka year to determine the expired Kaliyuga year.) clearly lays down that the first year of the Kaliyuga corresponds to 3102-01 BC.

Vara_hamihira (*Br.hatsam.hita_* 13.3) and Kalhan.a (*Ra_jataran:gin.i*, 1.51-56), however, reckon that the battle of Kuruks.etra (and consequently the birth of Pariks.it) occurred 653 years after the beginning of the Kaliyuga, i.e. ca. 2449 BC. Vara_hamihira notes (*Br.hatsam.hita_* 13.3: **a_san magha_su munayah s'a_sati pr.thvi_m yudhis.t.hire urpatau s.ad.dvikapan~ca dviyutah s'akaka_lastasya ra_jyasya**) that the Saptars.i were at the naks.atra (asterism) Magha_ when the king Yudhis.t.hira was ruling and (the beginning of) his reign was 2526 years earlier than (the beginning of) the s'aka-ka_la. This tradition makes the succession of Yudhis.t.hira 653 years (3179 minus 2526) after the beginning of the Kaliyug. Similarly, Kalhan.a notes (*Ra_jataran:gin.i* 1.49: **bha_ratam dva_para_nte bhu_d va_rtay eti vimohita_h kecid eta_m mr.s.a_ tes.a_m ka_la san:khya_m pracakrire**), that is, the Bharata war was not fought at the end of Dva_para; that the Kurus and Pa_n.d.ava flourished in the expired year 653 of the Kaliyuga.

Kalhan.a's Ra_jataran:gin.i_ (1.55-56) notes: "From one naks.atra to another, the Great Bear moves ina hundred years; such being its course, the author of Br.hat Sam.hita_ has furnished a solution on this point (12.3). The Great Bear stood in the constellation Magha_ when king Yudhis.t.hira ruled the earth; two

thousand five hundred twenty-six (2526) years prior to the S'aka era was the epoch of his reign."

The reference to S'aka ka_la occurs in Br.hat Sam.hita_ as follows (8.20.2): gata_ni vars.a_ni s'akendra ka_la dhata_ni rudrair-gun.ayet caturbhih labdhena yuktam s'akabhu_pa ka_lam sams'odhya s'astyau vis.ayairvidhajya. "In this s'loka Vara_ha Mihira uses two words—namely s'akabhu_pa and s'akendraka_la—not merely s'aka ka_la. The word means 'the king of s'akas' or the lord of s'akas (s'akendra). Obviously, S'a_liva_hana is not a king of the s'akas or a s'aka bhu_pa but he was an Aryan king or an Indian king. So s'a_liva_hana cannot be the s'aka king but it can only be Cyrus the Great of Persia whose Era of 550 BC. For the Greeks referred to the Persians as 'sakoi'…Commentator Bhat.t.otpala clarifies that s'aka is a non-Indian king, saying: s'aka na_ma mleccha ja_tayo ra_ja_nah." (pp. 247-248). "So all these terms s'aka ka_la, s'aka nr.pa ka_la, s'akabhu_pa ka_la and the s'akendra ka_la were evidently mentioned to denote the same date, i.e. the date of the establishment of s'aka sa_mra_jyam by the s'aka king Cyrus the Great." (Jagannadha Rao, 1931, *The Age of the Mahabharata War*, Bezwada; cf. Thiruvenkatachar, 1950, Ayanams'a in Indian Chronology, *JTH*, XXVIII, pp. 103-109).

Vara_ha Mihira notes: (Br.hat Sam.hita_ 13.3) a_san magha_su munayah s.a_sati pr.thvi_m y8udhis.t.hirey nr.patau s.ad.dvikapancadviyuta (2526) s'aka ka_lastasya ra_jnasca. This means that when King Yudhis.t.hira reigned the earth, the Sapta R.s.is were in Magha star and his time equals 2526 years of s'aka ka_la of that King (a reference to the s'aka king, Kign Cyrus). Thus adding 550 BC (the S'aka or Cyrus Era) to 2526 years, we get 3076 BC. This places Yudhis.t.hira 25 years after the Kali Era: 3102 – 25 = 3075. This reckoning is consistent with the astronomical observation recorded in Kaliyuga Ra_ja Vr.tta_nta (3.3): pancavim.s'ati vars.es.u (25) gates.wadha kalau yuge sama_s'rayanti as'les.am munayaste s'atam sama_h tadaiva dharmaputropi maha_ prasta_namastithah; 'when 25 years have elapsed in the Kali Yuga (i.e. 3102 – 25 = 3077 BC), Dharmaputra (Yudhis.t.hira) attained heaven. The Seven R.s.is enter the As'les.a star then'. The Great Bear or the Sapta R.s.is stayed for 75 years before and 25 years after the Kali Yuga for a total of 100 years in the Magha star. They left the Magha star in the 25th year of Kali and entered As'les.a star when Yudhis.t.hira attained heaven.

The anamoly in Kalhan.a's reckoning is explained as caused by a confusion between two eras: "The case of S'a_liva_hana s'aka of 76 AD, which was confused with the 's'aka-nr.pati ka_la' or the era of the S'aka King Cyrus the Great of 550 BC…The confusion arose on account of the word s'aka which means an 'era' Sanskrit being confused with another word 's'aka-bhu_pa' or the 'King of the S'akas'…Kalhan.a writing as he did in 1148-49 AD uses the S'a_liva_hana S'aka instead of the Era of the S'akabhu_pa or Cyrus to Vara_ha Mihira's s'loka. The difference is exactly equal to the sum of these Eras! …one more point bears mention. Namely the year 2526 given by Vara_ha Mihira is based on the authority of Garga, from whom the figure 2526 is quoted. **Garga cannot be later than the S'a_liva_hana s'aka of 78 AD.** This will suffice to prove Kalhan.a's error. But Kalhan.a by using the same S'a_liva_hana s'aka of 78 AD comes to the conclusion, that Mahabharata war occurred 653 years after the Kali Yuga Era. This gives the date 2449 BC to Mahabharata war. Interestingly, the error is exactly equal to the cumulative difference of the Era of Cyrus the Great of 550 BC, the Yudhis.t.hira Ka_la of 25 Kali and 78 AD years of S'a_liva_hana s'aka thus: 550 Cyrus Era + 25 Yudhis.t.hira Ka_la in Kali Era + 78 S'a_liva_hana Era = 653 years. In other words, 3102 minus Kalhan.a's 653 years = 2449 BC. Thus the cumulative error of 653 years it the sum of the Eras of Yudhis.t.hira (25), Cyrus 550 BC and S'a_liva_hana 78 AD in Kali years. Thus 2449 BC + 25 + 550 + 78 = 3102." (Vedavyas, 1995, *Astronomical Dating of the Mahabharata War*, Hyderabad, Vedavyasa Bharathi University of Vedic Sciences, pp.229, 250)

The Aihole Inscription (cf. *Indian Antiquary* V.7; VIII.237) reads as follows:

'trims.at.su tri-sahasres.u
bharata_d ahavadditaha
sapta_bda s'ata yuktes.u
s'a(ga) tes.wabdes.u pancasu (3735)
panca_s.at.su kalau ka_le
s.at.su panca s'ata_su ca (556)
sama_su samati_ta_su
saka_namapi bhu-bhuja_m'

(Uptil now, 3375 years have elapsed in the Kali yuga since Mahabharata war took place, and 556 years of the S'a_liva_hana era have also elapsed). The date of the Aihole inscription was 556 s'a_liva_hana era (or 634 AD) current which equals 3375th year in the Kali yuga. So, kalau ka_le (the year of Kali yuga) is

computed as 3735 minus 556 i.e. 3179 before s’a_liva_hana era which equates with 3101 BC.

In the following 11 tables, the chronology of kings is given as described in the pura_n.as. (D.S. Triveda, 1963, *Indian Chronology*, Bharatiya Vidya Bhavan, Bombay)The last column indicates the location of Sapta R.s.i (Great Bear) as a cross-check on the veracity of the pura_n.ic evidence which often cites the astronomical indicator. [It takes 1500 years for Sapta R.s.is to go from Magha star to Pu_rvas.a_d.ha star. This is the period between Pariks.it and the start of the Nanda Dynasty). The total period described accounts for 4333 years and 129 kings as follows:

Dynasties of 129 kings who ruled for 4333 years from 3140 BCE to 1193 AD (Pura_n.as)

Chronologies of Indian Kings with reference to Kali yuga starting in 3102 BC (1)

"When Aja_tas'atru came to the throne (of Magadha), Gotama (Buddha) was seventy-two years old, but his genius still shone bright and clear..." (Kenneth T. Saunders, 1922, Heritage of India Series: *Gotama Buddha*, p. 70 and 76) "It is therefore clear that Buddha was the son of King Suddhodana, the 23rd of the Kings of Iks.va_ku Dynasty...Buddha was the contemporary of Ks.emajit, Bimbisa_ra and Aja_tas'atru, the 31st, the 32nd and 33rd kings of Magadha. The Buddhist works say that Buddha was seventy two years old at the time of Aja_tas'atru's coronation. According to the Pura_n.as, Aja_tas'atru's coronation was in 1814 BC...It has been proved on astronomical grounds that 27-3-1807 BC is the true and correct date of death of Buddha. It falls in the eighth year of the reign of King Aja_tas'atru. The date explains the possibility of the existence of Buddhism in the second millennium BC, as mentioned in Kalhan.a's Ra_jataran:gin.i_ and Nepal Vams'a_val.i" (K. Venkatachalam, 1956, *Buddha Millinda and Antiyoka and Yuga Pura_n.a*, p. 17).

3	King Marjari		3099	
	Buddha’s birth		1215 Kaliyuga (1887 BCE)	
	Buddha’s Nirva_n.a	Age: 80 years	1807 BCE	

Chronologies of Indian Kings with reference to Kali yuga starting in 3102 BC (2)

Barhadradha Dynasty (3138 to 2132 BC or 1006 years) cf. Matsya and Vis.n.u Pura_n.a (cf. K.P.Jayaswal, Barhadradha Chronology, JBORS, IV.I ; Sitanandh Pradhan. Chronologyh of Ancient India, Calcutta; Hemachandra Ray Chowdhri, Political History of India from the accession of Parikshit to the extinction of Gupta Dynasty, Calcutta)

Sl. No.	Event/King	Reign Years	Before Common Era	Sapta R.s.is in Star
2	S'rutasrava	64	3080	
7	S'yenajit	50	2859	
9	Mahabha (Vibhu)	35	2769	Punarvasu
10	S'uci	58	2734	
11	Ks.emya	28	2676	A_rdra
15	Suvrata	38	2491	
16	Dr.d.hasena	58	2453	Kr.ttika_
18	Subala	22	2362	
19	Sunetra	40	2340	Bharan.i
22	Ripunjaya	50	2182-2132	Uttarabhadra

Chronologies of Indian Kings with reference to Kali yuga starting in 3102 BC (3)

Pradyota Dynasty (2132 to 1994 BC or 138 years) [When King Pradyota was suffering from jaundice, the Magadhan king Bimbisa_ra sent his court-physician Ji_vaka who had received his training in Taxila…The Maha_vagga (SBE XVII, p.1) offers a reasonable evidence to prove that the kingdom of Anga came under Bimbisa_ra's sway…the Buddha dwelt with the Bhikkhus at the Supatit.t.ha cetiya near the pleasure garden of Lat.t.hivana near Ra_jagaha, where Bimbisa_ra, King of Magadha, came to invite him with the congregation of monks. (VT., I, pp. 136 ff.): Vinaya Pit.aka; loc.cit. B.C. Law, 1932, *Geography of Early Buddhism*, London, p.20, 76)]

1	Pradyota (Bala_ka)	23	2132	
2	Palaka (Pulaka)	24	2109	
3	Vis'a_ka yu_pa	50	2085	Uttarabhadra
5	Nandivardhana	20	2014-1994	

Chronologies of Indian Kings with reference to Kali yuga starting in 3102 BC (4)

S’is’una_ga Dynasty (1994 to 1634 BC or 360 years) [In dhe Divya_vada_na (p.55) we find the Buddha saying to the Bhikkhus that in order to go to Ra_jagaha from Sa_vatthi_ one should cross the Ganges by boats kept either by King Aja_tasattu or by the Licchavis of Vesa_li_: loc.cit. B.C. Law, 1932, *Geography of Early Buddhism*, London, p. 10)

Sl. No.	Event/King	Reign Years	Before Common Era	Sapta R.s.is in Star
2	Ka_kavarn.a	36	1954	
5	Vindhyasena (Vidhisara)	38	1852	
7	Dars’aka (Vams’aka)	35	1787	Dhanis.a
8	Udayana (Udasi_na)	33	1752	
9	Nandivardhana (Ka_kaverma)	42	1719	

Chronologies of Indian Kings with reference to Kali yuga starting in 3102 BC (5)
Nanda Dynasty (1634 to 1534 BC or 100 years): Vis.n.u Pura_n.a (4.24); Bha_gavata Pura_n.a (2.2); Va_yu Pura_n.a (XCIX); Matsya Pura_n.a (CCLXX); cf. D.S. Triveda, 1963, Indian Chronology, Bharatiya Vidya Bhavan, Bombay

Sl. No.	Event/King	Reign Years	Before Common Era	Sapta R.s.is in Star

Chronologies of Indian Kings with reference to Kali yuga starting in 3102 BC (6)
Maurya Dynasty (1535 to 1219 BC or 316 years)

Sl. No.	Event/King	Reign Years	Before Common Era	Sapta R.s.is in Star
1	Chandragupta	34	1535-1501	
3	As’oka (As’okavardhana)	36	1473-1437	
4	Suyas’as (Supra_va or Kunala)	8	1429	
7	Hars.avardhana	8	1343	Mu_la
9	Sa_lisuka	13	1321	

Chronologies of Indian Kings with reference to Kali yuga starting in 3102 BC (7)
Sunga Dynasty (1219 to 919 BC or 300 years); Kaliyuga Ra_ja Vr.tta_nta (3.2)

Sl. No.	Event/King	Reign Years	Before Common Era	Sapta R.s.is in Star
1	Pus.yamitra	60	1219	
2	Agnimitra	50	1159	Anura_dha
3	Vasumitra	36	1109	
4	Sujes.t.ha	17	1073	Vis'a_kha

10	Devabhuti	10	929	

Chronologies of Indian Kings with reference to Kali yuga starting in 3102 BC (8)
Kan.va Dynasty (918 to 833 BC or 85 years)

Sl. No.	Event/King	Reign Years	Before Common Era	Sapta R.s.is in Star
1	Vasudevakan.va	39	918-879	Chitt
2	Bhumimitra	24	855	

Chronologies of Indian Kings with reference to Kali yuga starting in 3102 BC (9)
Andhra Dynasty (834 to 328 BC or 506 years)

7	Lambodara	18	691	

11	Skandas’atakarn.i	7	625	
12	Mr.gendras’atakarn.i	3	618	
13	Kuntalas’atakarn.i	8	615	

19	Hala	5	495	
20	Mandalaka	5	490	
21	Puri_ndrasena	21	485	Magha
22	Sundaras’atakarn.i	1	463	
23	Cakoras’atakarn.i	½	462	

27	Pulomayi II	32	377	
30	Yagna S’ri S’atakarn.i	19	344	
31	Vijaya s’ri s’atakarn.i	6	338	
32	Candra s’ri s’atakarn.i	3	335	

Chronologies of Indian Kings with reference to Kali yuga starting in 3102 BC (10)

Gupta Dynasty (327 to 82 BC or 245 years); Alexander crosses Jhelum in 326 BC

Sl. No.	**Event/King**	**Reign Years**	**Before Common Era**	**Sapta R.s.is in Star**
1	Candragupta I (Vijayaditya or Sandracottus (Greek)	7	327	
5	Skandagupta (Para_krama A_ditya)	25	191	

3	Devapi	3
6	S’a_liva_hana born 3179 Kaliyuga	
7	S’alihotra S’a_livardhan S’akahanta Suhotra Havirhotra Indrapala Malyavan S’ambhudatta Bhimaraja Vatsaraja Bindupala Rajapala Mahanara Somavarma Kamavarma Veerasimha Rangapala Kalpasimha	
8	Gangasimha (died 1193 AD); War with Muhammad Ghori started in 1193 AD or 4295 Kali yuga	

Shifts of Late Harappan population away from the banks of the desiccated River Sarasvati, from the southwest to the northeast

Number of Late Harappan sites decrease in the Bahawalpur region and are totally absent in Ganganagar District; number of sites increase in Haryana, Punjab and Uttar Pradesh with major concentrations in the Jind, Kurukshetra, Karnal, Hissar and Ambala districts; almost all districts of Punjab; Saharanpur District of U.P.. In Mahendragarh and Gurgaon districts, the Late Harappan sites represent the earliest human settlements.

Cronological bracket of the Sarasvati Civilization

(S.P.Gupta, 1993, Longer chronology of the Indus-Sarasvati Civilization in: *Puratattva*, No. 23, 1992-93, pp. 21-29.)

"... only two dates, one from Mitathal and the other from Hulas, pre-date 2700 BC. Further, only one date, from Surkotada, lies between 2700 and 2600 BC. There are at least five dates between 2600 and 2500 BC. From 2500 BC onwards there is a heavy concentration of dates. This concentration begins to peter out after 2000 BC. Later than 1800 BC the dates are very sporadic as was the case prior to 2600 BC. It would thus work out that the main lifespan of the Mature Phase of the Harappan Civilization was between 2600 and 2000 BC, with a margin of about a hundred years on the later side. The beginning of the Early Harappan phase... is ascribable to the first quarter of the third millennium BC. As to the Late Harappan Phase, it may have persisted for a couple of hundred years after 1900 BC." (Lal, opcit., p. 115).

"The overall chronological bracket of the Early Indus-Sarasvati Civilization falls between 3300 B.C. and 2700 B.C... The overall assessment, therefore, comes to the hard fact that the beginning of the early Indus-Sarasvati Civilization goes back at least to the 31st century B.C. (Possehl, G.L., Radiometric Dates for South Asian Archaeology, Xeroxed copy, 1993; loc. cit. S.P.Gupta, op. cit.)... the mature Indus-Sarasvati Civilization is to be placed in the 28th century B.C... (Late Indus-Sarasvati phase)... it was during this phase that the so-called neolithic-chalcolithic cultures, particularly the Banas, the Kayatha and the Malwa culture-complexes, which flourished in Rajasthan, Central India and Maharashtra, closely interacted with the last sub-phase of the

Mature Indus-Sarasvati Civilization... we see, for example, mother-goddess figurines, bull figurines and the depiction of pipal leaf on pottery still continuing as manifestations of age-old popular beliefs. Steatite, shell, faience and carnelian objects of everyday use, such as the bangles, beads and various other ornaments go a long way to prove that the Indus-Sarasvati traditions in crafts continued to be practised.

“It is true, however, that Harappa's 'Cemetery H' presented a far different form of material culture than the Lothal 'B' culture, and Lothal 'B' culture is different from Late Rojdi culture, and this too was different what Hulas (upper levels) presented; but it only reiterates what we observed earlier -- the Late Harappan develops regional culture-complexes although certain beliefs and crafts of the old traditions (Mature Indus-Sarasvati) still continued to be practises... there are several times more sites on the banks of the river Sarasvati and its tributaries than on the banks of the Indus. Mughal has already plotted 363 sites only in Cholistan, i.e. old Bahawalpur State (Mughal, M.R., Recent archaeological research in Cholistan desert, in: Possehl (ed.), *Harappan Civilization*, New Delhi, 2982, pp. 85-96). There are 25 sites which A. Ghosh explored on the Indian side of the Sarasvati in District Ganganagar (Ghosh, A., The Rajputana Desert--its archaeological aspect, *Bull. of the National Institute of Sciences of India*, No. 1, pp. 37-42). J.P. Joshi and others located 62 more sites further east in Punjab, Rajasthan and Haryana (Joshi, J.P., Madhu Bala and Jassu Ram, The Indus Civilization: a reconsideration on the basis of distribution maps, in: B.B. Lal and S.P. Gupta (eds.), *Frontiers of the Indus Civilization*, New Delhi, Books and Books, 1984, pp. 511-530). Thus, there are as many as 500 sites, if not more, on the River Sarasvati and Drishadvati (old courses and new courses together, plus their tributaries). Obviously, the Sarasvati played a very vital role in the formation and development of this civilization... the civilization has been here entitled by us as the 'Indus-Sarasvati Civilization'."

The finds at Mehrgarh dated to ca. 7000 BC indicate the early phases of village farming communities and pastoral communities. Prof. Possehl provides a broad spectrum of phases related to the absolute chronology of the “Indus Age”:

- Beginnings of Village Farming Communities and Pastoral Camps (Kili Ghul Mohammad and Burj Basket-marked phases) 7000-4300 BC

- Developed village farming communities and pastoral societies: 4300-3200 BC

- Early Harappan phases (Amri-Nal, Kot Dijian, Sothi-Siswal, Damb Sadaa) 3200-2500 BC

- Mature Harappan 2500-1900 BC

- Post-urban Harappan 1900-1000 BC

- Early Iron Age 1000-600 BC

(After Gregory L. Possehl, 1999, *Indus Age: The Beginnings*, New Delhi, Oxford and IBH Publishing Co., Table 1.2).

G.Urban M. Jansen, *Forschungsprojekt DFG Mohenjo-daro,* Aachen, 1981:

"The archaeological evidence pertaining to the earliest or first settlement at Kot Diji which was originally labelled 'Kot Dijian' has become a basic frame of reference for reconstructing a relative chronology of the early sites of the fourth and early third millennia B.C. in the Greater Indus Valley, drained by the Indus and its present and former tributaries including the now dry Ghaggar-Hakra rivers... The earliest layers of the settlement outside the fortified area correspond in time with the middle Kot Dijian levels and were dated 2805-2885 B.C. No C-14 date is available for the upper Mature Harapan occupation at Kot Diji but its contemporaneous materials at Mohenjo-daro are dated between 2060 and 2583 B.C. Thus, the Kot Dijian occupation turned out to be at least 500 years older than the fully urbanized stage of the Indus Civilization as represented at Mohenjo-daro... Kot Dijian cultural materials, both chronologically and culturally constitute an Early Harappan or formative stage of the Indus Civilization... processes of urbaniztion in the Greater Indus Valley had started during the fourth millennium B.C. The evidence from several sites clearly demonstrated that the first settlement of Kot Diji was an integral part of the cultural phenomen which was wide-spread throughout the Greater Indus Valley with remarkable uniformity of essential elements which later characterized the Indus Civilization in fully developed or urban stage... In India, the areas originally drained by the Ghaggar-Hakra rivers and their

tributaries in northern Rajasthan, East Punjab and Haryana yielded a succession of Kot Diji related sites among which Kalibangan, Siswal, Mitathal, Banawali, Bhundan and Manda were also excavated... Dr. Allchin also continued to ignore the new discoveries especially in Bahawalpur... the geographical extent of the Early Harapan settlements as revealed by intensive field works started at the beginning of this decade, almost duplicates that of the succeeding Mature Harappan swettlements... (the civilization) certainly did originate and develop in the Greater Indus Valley." (pp. 1-19)
Mughal, M. Rafique, 1982:

"On the Pakistan side, archaeological evidence now available overwhelmingly affirms that the Hakra was a perennial river through all its course in Bahawalpur during the fourth millennium B.C. (Hakra period) and the early third millennium B.C. (Early Harappan period). About the middle of the third millennium B.C., the water supply in the northeastern portion of Hakra, roughly between Fort Abbas and Yazman (near Kudwala) was considerably diminished or cut-off. But abundant water in the lower (southwestern part) of this stream was still available, apparently through a channel from the Sutlej; this is attested by the heavy clustering of sites in that area during the late third and early second millennium B.C. (Mature and Late Harappan periods respectively). About the end of the second, or not later than the beginning of the first millennium B.C., the entire course of the Hakra seems to have dried up and a physical environment similar to that of the present day in Cholistan set in. This forced the people to abandon most of the Hakra flood plain. A few Painted Grey Ware settlements, most of them smaller than four hectares in size, are located along the upper part of the Hakra river. These were sustained by a meager water supply reaching there with seasonal regularity from the Ghaggar... the presence of Hakra Ware sites on top of old,reddish-brown sand, as observed on the south and southwest of Derawar, sould seem to indicate that the Cholistan part of the Thar desert had already advanced close to Derawar prior to the fourth millennium B.C."

“The capture of the Sutlej by the Beas River above Ferozsepur appears to have completely cut off water-supply to the Hakra with disastrous effects on the cultural and physical environment of Bahawalpur. That event seems to have taken place around the middle of second dmillennium BC, a time when the last phase of the Indus Civilization, or Late Harappan period was approaching its end, but not one thousand years later at about 500 BC as Wilhelmy suggests. There are no settlements along the Hakra River west of Kudwala assignable to

the later cultures with the single exception of a Painted Greyware site near Yazman. The only other sites of the first millennium BC are those of the Painted Greywares but those too are mostly situated right in the dry Hakra bed between Fort Abbas and Kudwala. In brief, two major changes are suggested by the archaeological evidence. The first major change occurred during th e middle of the third millennium BC, when the Yamuna adopted its present course with the capture of water courses below Rupar such as Markanda and other streams, resulting in the drying of the Chautang River, a tributary of the Ghaggar-hakra and consequently reduced water in the eastern half of the Hakra River between Fort Abbas and Kudwala. The second major change took place during the second millennium BC, when the Sutlej which originally joined the Hakra east of Yazman, was captured by the Beas River and thus rendered the entire course of the Sutlej and the Hakra completely dry. These changes probably took place more by natural causes, such as tectonic disturbances, than by human disturbance of the landscape. The evidence of earthquakes is confirmed from archaeological contexts in the Ghaggar-Hakra region around the middle of the third millennium BC, coinciding with the first major hydrographic change as pointed out above. (Stein 1943).” (Mughal, 1997, *Ancient Cholistan*, Rawalpindi, Ferozsons Pvt. Ltd., pp. 25-26).

The most remarkable feature of the civilization during all its phases from 9000 to 3000 BP is the homogeneity of monuments and artifacts; the agreement among Harappa, Mohenjodaro, Kalibangan, Dholavira, Banawali, Kunal and Lothal is striking indeed, while regional variations are overshadowed by the preponderant shared features of life such as domestication of animals, cultivation of wheat and barley, canal irrigation and use of wells, house-building, organization of towns, weaving of textiles, wheel-turned pottery, river navigation, use of carts, metal-working, ornament-making using faience, ivory, bone, shell and semi-precious stones and use of inscriptions to facilitate trade. (cf. Marshall, John, 1931, The age and authors of the Indus Civilization. in: Marshall, Johned., *Mohenjodaro and the Indus Civilization*, 3 vols., Arthur Probsthain, London: 102-12). The homogeneous nature of the culture was evolved and sustained over the largest Bronze Age civilization of the world, covering an estimated area of 1,310,000 square kilometers. This is in comparison with the Mesopotamian Civilizzation which covered an estimated area of 400,000 square kilometers during the Akkadian Dynasty and with the Egyptian Civilization which covered a small area of ca. 17,100 square kilometersduring the Old Kingdom. (Butzer, Karl W., 19776, *Early Hydraulic Civilization in Egypt: A study in Cultural Ecology*, Chicago, University of

Chicago Press, Prehistoric Archaeology and Ecology Series: 83). The region covered the entire drainage system of the Sarasvati River, the northern Ganga-Yamuna doab in Uttar Pradesh, Punjab, Haryana, western fringe of southern and central Rajasthan, Gujarat, almost the whole of Pakistan (excepting for the northern mountainous areas) and southern Afghanistan. That homogeneity in culture was maintained over such vast distances given the transport systems of river crafts and bullock-carts (and perhaps pack-animals) is an era of peaceful coexistence unparalleled in the history of human civilization. For example, the mature Harappan pottery was seen over all parts of the civilization area and so were the seals, styles of beads, brick sizes and weights commonly shared. This lends credence to the possibility that this entire area was truly a Linguistic Area and given the legacy which continued in India into the historical periods, the decipherment of the inscriptions have to be related to the essential semantic unity of languages currently spoken in many parts of India also as a legacy of the cultural unity sustained during ancient times.

Concept of time and ancient Indian chronology

The R.ca (RV 1.164.48) records that a divine wheel with 12 spokes and 3 naves rests on the sky encircling it. The commentaries note that the 12 spokes refer to 12 signs of the zodiacf and 3 naves refer to the 3 principal seasons (considering the reference to Sarasvati_ in the context of the seasons in the very next r.ca)—the three seasons being summer, rains and winter. Another r.ca (RV 1.164.11) in the same su_kta refers to the wheel on the sky with 12 spokes which rotates and never tires. The commentaries note that this refers to sun's annual motion through the 12 signs of the zodiac. (The signs of the zodiac are: mes.a, vr.s.abha, mithuna, karkat.a, sim.ha, kanya_, tula_, vr.s'cika, dhanus., makara, kumbha, mi_na). In both these r.cas, the wheel denotes a solar year. A solar month is the time taken to traverse a sign of the zodiac or 30^0 longitude of the ecliptic (or vais'va_narapatha). Twelve solar months make one solar year. The r.ca (RV 1.025.08) notes that one who knows the secret of 12 months also knows the secret of the origin of the 13^{th} or supplementary month. The allusion is clearly to the reconciliation of the solar calendar with the lunar calendar. The duration of a solar year is 365 or 366 days. The duration of a lunar month is 29.25 to 29.82 days and thus, a lunar year, consisting of 12 lunar months takes 355 days to complete. Thus 3 solar years contain 36 solar but 37 lunar months. Hence, every third solar year, either the 37^{th} lunar month was skipped or declared an adhikama_sa or malama_sa when the performance of yajn~a is prohibited. The solar calendar was an agricultural

calendar with the maha_vrata day connoting the day of the summer solstice (called san:kra_nti in the historical periods) connoting the celebration of the first harvest of the year. (The a_ditya year starts with sankra_nti and consists of one revolution of earth around the sun; the year starts in caitra). The society was clearly agricultural in the days of the R.gveda and the lunar calendar provided a basis for determining the days to be prescribed for the yajn~a with reference to kr.s.n.a or s'ukla paks.as (dark and bright haves of the phases of the moon). The reconciliation of the solar and lunar calendars is noted in the naming of the solar months which are consistent with the names of the lunar months: for example,

(i) the month vis'a_kha starts when the sun enters the zodiacal sign mes.a (aries) [a full moon in this month occurs when the moon reaches the zodiacal sign tula (libra) placed diametrically opposite to mes.a] or when the moon is in conjunction with the asterism vis'a_kha in tula.
(ii) the month jyes.t.ha begins when the sun enters the zodiacal sign vr.s.abha (Taurus); the full moon in this month occurs when the moon is in conjunction with the asterism jyes.t.ha a.
(iii) the month s'ravan.a, a_s.a_d.ha, bhadra which occur in the lunar and solar calendars are similarly reconciled.

The sun's passage from the beginning of Mes.a to the end of Mi_na is called a saura year (solar year or vars.a, sam.vatsara). The sun's passage from the beginning to the end of a ra_s'i (one of the 12 ra_s'I or signs of the zodiac) is called a saura ma_a (solar month, normally named after the particular ra_s'I through which the sun passes at the time); the entry into a new ra_s'i is a san:kra_nti or san:kraman.a. Such a san:kra_nti day is reckoned as the first day of the solar month; the practice is in vogue in Punjab and Tamil region; in Bengal, however, the day following the san:kra_nti day is reckoned as the first day of the month. This leads to some variations in almanacs: the solar month of Mes.a (with which the solar year begins) is called Caitra in Tamil region, while it is called Vais'a_kha in Bengal.

Reckoning of Solar Months in Tamil and Bengali Regions

i_na	an:kuni	aitra

The reference to the intercalary or the 13th month is also noted in *Maitra_yan.i_ya Sam.hita_* (1.10.8): “The Maitra_yan.i_ya Sam.hita_, however, refers to the existence of two more astronomical schools of a different kind. The Sam.hita_ calls them Rituya_jis and Ca_turma_syaya_jis. The passage in which they are referred to runs (translated) as follows: ‘With each oblation, he suppresses twelve and twelve nights. They (the oblations) are as many, when counted, as there are nights in the year. He suppresses the year from the enemy. With Vais’vadeva sacrifice he suppresses four (intercalary months); with Varun.apragha_sa the next four and with S’a_kamedha the next four. These are what he suppresses from the enemy. He who sacrifices for the seasons is a sacrificer of one kind, while he who sacrifices for a set of four months is a sacrificer of another kind. He who knows that what was the spring became the rains (which in turn became) the autumn (and so on), and who accordingly sacrificed for them—this sacrificer is one who is called to be a sacrificer for the seasons. He who gains the thirteenth month and sacrificer for the thirteenth month is one who is said to be sacrificer for the four months. Having sacrificed during three ordinary (riju_) months, he should omit the fourth. Then having sacrificed during (the next) two ordinary (months), he should omit the third. As to the three years there are, in them there are thirty six full moons, as to the two, in them there are twenty four. As to those (days) which except (an intercalary month in the thirty-six full-moons), he takes them to these latter twenty-four months. This is verily the thirteenth month. He gains it and sacrifices for it.” (R. Shamasastry, 1912, *The Vedic Calendar*, Ganga Publications (Repr. 1979), New Delhi: p.73-74). Citing Nida_na Su_tra and S’rauta Su_tra of La_t.ya_yana, Shamasatry notes: “The word Ayana literally means ‘going, movement’; and when combined with such words as gava_m (of cows) and jyo_tis.a_m (of lights), it means ‘the movement of the cows’ and ‘the movement of the (heavenly) lights’. We have already seen how the Vedic poets used to call the first day of their s.ad.aha or six day’s period by the name jyotis. ‘light’ and the second day by the name, go_, ‘cow’. It follows, therefore, that the terms gava_mayana and jyo_tis.a_mayana mean ‘the march of days’…” (R. Shamasastry, 1912, *The Vedic Calendar*, Ganga Publications (Repr. 1979), New Delhi: p.58)

वेद॑ मा॒सो धृ॒तव्र॑तो॒ द्वाद॑श प्र॒जाव॑तः ।

वेदा॒ य उ॑प॒जाय॑ते ॥

RV 1.025.08 He, who accepting the rites (dedicated to him) knows the twelve months and their productions and that which is supplementarily engendered. [An allusion to the thirteenth, the supplementary or intercalary month of the Hindu unisolar year and to the transition to the lunar year from the solar year; 'that thirteenth or additional month which is produced of itself, in connection with the year', yah trayodas'o adhikama_sa upaja_yate sam.vatsarasami_pe svayam evotpadyate].

द्वादशारं नहि तज् जराय वर्वर्ति चक्रम् परि द्याम् ऋतस्य ।

आ पुत्रा अग्ने मिथुनासो अत्र सप्त शतानि विंशतिश् च तस्थुः ॥

1.164.11 The twelve-spoked wheel, of the true (sun) revolves round the heavens, and never (tends) to decay; seven hundred and twenty children in pais, Agni, abide in it. [Twelve-spoked wheel: the twelve signs of the zodiac: dva_das'a_ram dva_das'a san:khya_kames.a_dira_s'ya_tmakaih ma_sa_tmakairva_ araih ratha_n:ga_vayavayairyuktam; the term may also mean twelve months; seven hundred and twenty children: nights and days; three hundred and sixty of each: sapta ca vai s'ata_ni vim.s'atis'ca sam.vatsarasya_hora_tra_h sa es.ohah smma_nah (Aitareya A_ran.yaka 3.2.1)].

द्वादश प्रधयश् चक्रम् एकं त्रीणि नभ्यानि क उ तच् चिकेत ।

तस्मिन् साकं त्रिशता न शङ्कवो ऽर्पिताः षष्टिर् न चलाचलासः ॥

यस् ते स्तनः शशयो यो मयोभूर् येन विश्वा पुष्यसि वार्याणि ।

यो रत्नधा वसुविद् यः सुदत्रः सरस्वति तम् इह धातवे कः ॥

1.164.48 The fellies are twelve; the wheel is one; three are the axles; but who knows it? within it are collected 360 (spokes), which are, as it were, moveable and immoveable. [The wheel is the year of twelve months; the three axles are the three doubble seasons, or hot, wet and cold; and the three hundred and sixty spokes are the days of the lunar-solar year; stanah s'as'ayah, s'aya_na, sleeping; dehe vartama_nah, abiding in the body].

1.164.49 Sarasvati_, that retiring breast, which is the source of delight, with which you bestow all good things, which is the container of wealth, the distributor of riches, the giver of good (fortune); that (bodom) do you lay open at this season for our nourishment.

The kalpa is the largest unit of time in ancient Indian astronomy. A kalpa equals 1,000 maha_yugas. “This maha_yuga of the Hindus is a period of approximately 4,320,000 years, in which they say all the planets recur at nearly the same position. The astronomer Stuart showed that this is correct and the period is 4,319,936,8663 years; at the end of which Mercury, Venus, Earth, Mars, Jupiter and Saturn return to a position in the fix zodiac about 20^0 behind where they started. He found that this also applies to the ‘new’ planets, Uranus and Neptune; and that an increase in the period of Pluto of only one part in 100,000 or 0.001 per cent, will also bring it into recurrence.” (Astrological Research Society, *Encyclopaedia of Astrology,* New York: p. 231). Indian astronomy notes that a deva vars.a (divine year) equals 360 ma_nava var.s.a (human years). One Kaliyuga equals 1200 divine years (or 1200X360 = 432,000 human years). At the beginning of the present kalpa, or about 1.97 billion years ago, a conjunction of all the planets occurred precisely at the asterism as’vini in the zodiacal sign mes.a. Such a conjunction recurs at an interval of about 432,000 years. The occurrence of a single conjunction every 432,000 years is thus referred to as kali (or one, in the game of dice), as distinct from kr.ta (which connotes four, in the game of dice). Twice the interval of 432,000 or 864,000 years is called dva_para and thrice the interval is called treta. Krita or four-fold interval (i.e., 1,728,000 years) is the lucky win in the game of dice. It is said that all the planets meet precisely at as’vini at a regular interval of a maha_yuga. (*Su_rya Siddha_nta*: 1/15-17; *Manu Samhita_:* 1/68-72). Seventy one maha_yuga plus one kritayuga or 308,448,000 years make one manvantara (manu + antara); within this period, the sun completes one revolution around the parames.t.hi man.d.ala (the centre of the Milky Way, the a_ka_s’a gan:ga_). The completion of a manvantara is accompanied by the annihilation of life and the life process begins anew with a new Manu. Fourteen manvantaras occur in cycles: svayamb huva, svaros.ica, uttamaja, tamasa, raivata, caks.usa, vaivasvata, savarn.i, daks.asavarn.i, brahmasavarn.i, dharmasavarn.i, rudrasavarn.i, raucya, bhautyaka. (*Manu Sam.hita_:* 1/61-62).

The Maha_vrata Day: Winter Solstice

J.C. Ray started with the accepted equivalence of dhanis.t.ha_ (or s’ravis.t.ha_) with the star Beta delphini and calculated that the winter solstice occurred in the first point of Dhanis.t.ha_ in 1372 B.C. and in the first part of S’ravan.a_ in 405 B.C. (the earliest year in which the new moon happened on the day of the winter solstice was 401 B.C.). (J.C. Ray, 1934, The First Point of As’vini, loc.

cit. in: V. S. Agrawala, 1953, *India as known to Pa_n.ini*, Lucknow, pp. 416-62).

"From this day (401 B.C.), it is easy to calculate that the winter solstice began to be in dhanis.t.ha_--that is, at the last point of the asterism—in (1372 + 958 = 2330 B.C.). A table based on the average rate of precession can show us at a glance the asterisms of the winter solstice in the ages before 2330 B.C.

From 3288 to 2330 B.C.:	S'atab his.a
From 4246 to 3288 B.C.:	Pu_rva Bha_drapada_
From 5204 to 4246 B.C.:	Uttara Bha_drapada_
From 6162 to 5204 B.C.:	Revati_
From 7220 to 6162 B.C.:	As'vini_"

(K.D. Sethna, 1989, *Ancient India in a New Light,* Aditya Prakashan, Delhi: p. 110).

The ancient periods related to each asterism are a span of 958 years. This span is computed as follows. It takes 958 2/27 years for the passage of the Sapta R.s.i man.d.ala from one asterim to another asterism. The rate at which the equinoctial and solstitial points shift from asterism to asterism is arrived at by dividing by 27 (the number of asterisms), the time required by these points to perform one complete circuit of the Milky Way. The points perform one complete circuit, which is called a period of precession, in 25,868 years. (*The New American Encyclopaedia*, 1945, New York, p. 1116, 'Precession of the Equinoxes'). The average rate is: 25,868 divided by 27 = 958 2/27 years. By the attraction of the sun and the moon on thee earth's protuberant equatorial ring, the equinoctial points reach the meridian a little sooner than they otherwise would. This movement of the points is called the 'precession'. This is a seeming anomaly wherein the equinox—vernal (position of sun on March 21) or autumnal—moves through the asterisms in the reverse order. The last point of an asterism is reached first and the first point last; conversely, the asterism, in which the equinox takes place immediately before it occurs in another, is the one which in the normal order comes after it. The point of the winter solstice lies exactly halfway between those of the autumnal and the vernal equinoxes. (K.D. Sethna, 1989, *Ancient India in a New Light*, Aditya Prakashan, Delhi: p. 109).

If the Sapta r.s.i cycle commenced in the period from 7220 to 6162 B.C., As’vini could be taken as the first asterism.

It would appear that the origin of the Yuga computation and the number 4,320,000 years was derived by the ancient Hindu astronomers to account for the anomaly of the precession. Cunningham notes that precession of exquinoxes per year was fixed by Para_sara at 46.5 seconds and by A_ryabhat.a at 46.2 seconds. Given the precession, the period of one revolution through the whole circle of the ecliptic of 360 degrees could be computed. As 60 minutes make one degree and 60 seconds make one minute, the coverage of the full circle of the ecliptic will take 360X60X60 = 1,296,000 seconds divided by 46.5 or 46.2. To avoid the decimals in computation both the numerator and denominator are multipled by 10; this step yields 12,960,000/465 or 12,960,000/462. Simplifying the terms which are divisible by 3, the resultant equations are 4,320,000/155 or 4,320,000/154 years. The numberator of 4,320,000 is precisely equal to the number of years included in a Maha_yuga, or the set of four yugas (Kr.ta, Treta, Dva_para, Kali). (A. Cunningham, 1883, *The Book of Indian Eras*, Calcutta: p.4)

Whitney notes that the opening of the forward motion of the Sapta R.s.i cycle was introduced about 490 A.D. when the vernal equinox took place in the first point of that asterim.(*Su_rya Siddha_nta*, VIII,9, p. 211). “The early lists all began with Kr.ttika_, but the Maha_bha_rata puts S’ravan.a_ first, the Jyotis.a Veda_n:ga begins with S’ravis.t.ha_, the Su_rya Prajn~a_pti with Abhijit, the Su_rya Siddha_nta with As’vini_. But here As’vini_ is definitely equated with the vernal equinox, while Abhijit, S’ravan.a_ and S’ra_vis.t.ha_, which are continuous, are equated with the winter solstice.” (Kaye, *The Indian Antiquary*, Vol. 50, p. 47). Sengupta notes the oldest astronomical reference is to winter solstince happening on the full-moon day of the month Pha_lguna in the year ca. 4550 B.C. and adds: “The Vedic year-long sacrifices were begun in the earliest times on the day following the winter solstice…Winter was thus the first season of the year…The Indian years, before the time of A_ryabhat.a I, were generally begun from the winter solstice day, but after his time gradually the year came to be reckoned from the vernal equinoctical day.” (Sengupta, P/.C., 1947, *Ancient Indian Chronology*, Calcutta: pp. xviii,169; p. 156; p. 166; p. xx). The equinoctical point of the winter solstice is midway between those of autumnal and the vernal equinoxes, that of the summer solstice vice versa. (*The New American Encyclopaedia*, 1945, New York, p. 1265, ‘Solstices’)

There are seven kalpas: svetavara_ha, nilalohita, va_madeva, gathantara, raurava, pra_n.a, br.hat One kalpa is the day of Brahma and the following kalpa is the night of Brahma, the creator; thus, two kalpa make one brahmadivasa (Brahma day), 360 brahmadivasa make one brahma vars.a, 100 brahma vars.a make a paramayuga or the life-span of Brahma. One paramayuga is one day of Vis.n.u. The first 50 years of Brahma's life is called pratha-para_rdha and the remaining 50 years of Brahma's life is called dviti_ya para_rdha. At the end of Brahma's life the entire created universe is believed to resolve into its ultimate source and a new creation begins with a new Brahma (*Su_rya Siddha_nta*: 1/20-22).

Indian astronomers compute the number of complete revolutions made by planets in the interval of one maha_yuga (since all the planets are said to meet at as'vini at a regular interval of one maha_yuga). The maha_yuga period divided by number of complete revolutions made by each planet provides the number of days taken by each planet to complete its revolution.

Planet	No. of revolutions within a maha_yuga	Period of revolution (in civil days) according to Su_rya Siddha_nta	Period of revolution (in civil days) according to modern astronomy	Error in civil days

[Source for Indian astromical computations: *Su_rya Siddha_nta*: 1/29-34).

"According to traditional chronological accounts of the Ra_jataran:gin.i (12^{th} cent. Work of Kalhan.a) and the Vedic astronomical calendar, S'raddhadeva Vaivasvata was crowned Manu, the first king of human society in this age (manvantara-maha_yuga), by the Saptar.s.is (seven great sages) in the year 8576 B.C. on ma_gha s'ukla prathama_, when the vernal equinox was in the first quarter of the star magha_ naks.atra, 120^0 on the Indian standard ecliptic. (K.Srinivasaraghavan, *Saptarshi Era*, Madras, 1974; loc. cit. Sakhyananda, Glim*pses from our glorious Past*, Chennai, 1984, p. 10)…During the Vedic age of Manu and the Saptar.s.is…the vernal equinox…used to occur sometime in the middle of August, instead of March 21 of the modern Western calendar. Summer solstice was then in vis'a_kha_, 210^0, and used to occur sometimes in November instead of June of the Western calendar. After a lapse of 5,475 years (in 3101 BC), during the age of Maha_bha_rata and Kaliyuga, 46^0; and the summer solstice was in purva_ phalguni_, 136^0 From this it is clear that, from the days of Manu to Kaliyu_di, through a passage of 5,475 years, the equinoxes and solstices have fallen back by about 74^0 on the ecliptic. That means, the precession was taking place at an average rate of seventy-four years per degree during these five and a half millennia…Now (1980), the vernal equinox is in uttara_ bha_drapada_, 336^0, that is, 24^0 behind the zero point. That means, the equinoxes and solstices have been preceding at an average rate of 72.5 years per degree during these five millennia…Our ancient R.s.i-astronomers minutely observed this unique phenomenon of precession of the solstices and equinoxes, they called it 'a_yana calanam'—and came to the certain conclusions regarding the march of time. The R.s.is who studied the phenomenon during the precessional motion of the equinoxes through punarvasu, a_rdra_ and mr.gasi_ras naks.atras (roughly between 6350 and 3350 BC), found the rate of precession to be seventy-five years per degree. At this rate, 1,000 years will be required for precession through a naks.atra of 13.33^0, 2,250 years for a ra_si of 300, and 27,000 years for one cycle of precessin on the ecliptic of 360^0…There is a passage in R.gveda (8.2.41) giving some hints about a_yanacalanam. It reveals that a quarter of the ecliptic (right angle of 90^0) is equal to seventy-two s'atakas (7,200 years); that one full cyclic precession would require 28,800 years at a rate of eighty years per degree. From this hint we may infer that this particular mantra was revealed at a time when the rate was eighty years per degree—probably between 8500 and 8000 B.C. This does not, however, mean that all the mantras of the R.gveda

were revealed during this period. They have come down to us through tradition, transmitted through a continuous line of teachers and disciples from time immemorial…” (ibid., pp. 19-21).

Manu’s date has been determined by determining the position of Saptarshi in Manu’s days, by calculating backwards from the acknowledged date of Kali Yuga, 3102 BC. A unique measure for this background computation is that the Saptarshi takes 100 years to traverse one star. There are 27 stars in the Zodiac; all the stars are constant. So, one revolution of Saptarshi over the 27 stars takes 2700 years. Allowance is made for recession in the movement of Saptarshi at the rate of 72-75 years per degree. Tradition has it that celebrated astronomers have provided for this allowance: Vis’va_mitra 7000 BC, Para_sara 4100 BC, Vedavya_sa 3100 BC, Vr.dha Ga_rga 1400 BC and in Su_rya Siddha_nta of 300 AD.

There are faint indications within the Vedic texts to perceive a relative chronology of composition: the sequence seems to be: R.gveda, Sa_maveda, Yajurveda and the Atharvaveda. Within the R.gveda,man.d.alas II through VII are referred to as ‘family’ books (or, **A_rs.a man.d.ala**) since they are believed to have been composed by a family lineage of r.s.is. The six r.s.i families are: Gr.tsamada, Vis’va_mitra, Va_madeva, Atri, Bharadva_ja and Vasis.t.ha. A principle of organization of the family books is noted by Prof. A Bergaigne. Each man.d.ala has a collection of hymns addressed to Agni in the beginning and is followed by a collection of hymns to Indra, followed further by hymns to Soma and other divinities, of the earth, of the atmosphere and of the heaven. (Nirukta, 7.5: the three worlds are the abode of different gods; Nirukta, 7.15: devo da_na_d va_, di_pana_d va_, dyotana_d va_, dyustha_no va _ bhavati: deva is one who gives and one who enlightens; one synonym of deva is vasu_, fr. vas, to throw light, to shine; all 33 Vedic gods are vasu, the shining ones, vasis.t.ha, vivasvat, because they are resplendent). The deity to whom the largest number of hymns is addressed finds the first place in the ordering. The majority of the hymns of Man.d.ala VIII belong to the family of r.s.i Kan.va and is considered to be a separate addendum because of the use of strophic form of composition which is unique. Man.d.ala IX (called **Praga_tha or udgi_tha man.d.ala** sung by Udga_tr. in Soma yajn~a, the hymns are in a combination of metres, e.g.: ga_yatri, jagai, tris.t.ubh, br.hati kakubh, sato br.hati) which deals principally with the processing of soma which is also deified seems to be a sam.hita_ which includes specific r.cas recited by a number of priests including those who had composed man.d.alas II through

VII. Prof. Macdonell notes that the Man.d.ala IX might have come into being after the first eight books had been compiled and adds that the poetry of the Soma hymns of Man.d.ala IX has many points in common with the Avesta, and deals with a ritual going back to the Indo-Iranian period, and reached its conclusion as a whole in the early times among the Vedic r.s.is. But it should be noted that the hymns to Pavama_na Soma (clearly flowing Soma) are composed by the r.s.is of the families who produced the Man.d.alas II to VII. Books I and X have an equal number (191) of hymns containing r.cas of many families of r.s.is. It should be noted that there is an underlying current of a single theme which runs through all the ten man.d.alas. Sri Anirva_n.a (Veda Mi_ma_m.sa, I, pp. 49-51) notes that the collection of hymns in Man.d.alas II to IX unmistakably reflect a course of well-coordinated sacrificial discipline of the Hotr. priests (yajn~a bha_vana_). Man.d.ala VIII (or **Soma man.d.ala**) forms the fountain-source for the Sa_man hymns which are used by the Udga_tr. priest to invoke not Soma alone but Pavama_na Soma, the preparation of Soma after purification is the responsibility of the Adhvaryu priest. Thus all the Man.d.alas II to IX indicate a comprehensive structure of the R.gveda based on Soma sacrifice, the most important of all Vedic sacrifices. The invocations to th edeities, songs in their praise are interspersed with offering of Soma to the divinities, which are precisely the duties of the three priests in a Soma sacrifice: Hotr., Udga_tr., and Adhvaryu. In this perspective, Man.d.alas I and X become the prologue and the epilogue with identical number of hymns. The inclusion in Man.d.ala X of hymns related to os.adhi prayoga (97), sapatn-ba_dhana (135), alaks.mi_na_s'ana (155), yaks.ma na_s'ana (163), dussavpna-na_s'ana (165), svastyayana (165), sapatna-na_s'ana (166) indicate intimations of the Atharva Veda which are the domain of the fourth priest, Brahman. Thus, the R.gveda Sam.hita_ seems to include the functions of all the four priests: Hotr., Udga_tr., Adhvaryu and Brahman. Man.d.ala I is ascribed to about 15 r.s.is. All the r.s.is with the exception of the families of Bhr.gu, Atri and Bharadva_ja find their place. The r.s.is and the number of hymns ascribed to each are: An:girasa, 70; Gotama, 27; Kan.va, 27; Agastya Maitra_varun.i, 26; Vis'va_mitra 18; Parucchepa Daivoda_si, 19; Vasis.t.ha, 9; Ka_s'yapa, 1. It should be noted that Kan.va who contributed to 27 hymns in Man.d.ala is associated with many hymns of Man.d.ala VIII. There are many parallel and also identical passages in the two collections. There are also indications within the R.gveda indicating that the composition relates to the bronze age since there are reference to copper and bronze metals in addition to gold, silver and lead without any mention of iron. Atharvaveda seems to refer to iron (Gaurinath Sastri, 1982, *A History of Vedic*

Literature, Sanskrit Pustak Bhandar, Calcutta cf. Macdonell A.A.and Keith, A.B., 1912: *Vedic Index of Names and Subjects*, Vol. 1, 31-2, London). The R.gveda sam.hita_ was codified before the advent of iron age in India.

Di_rghatamas ponders on the description of the Transcendant God in the following words:

> I cannot understand. So, I put the question. He who has supported the six worlds, who is that indescribable one?

The sublime expression of monism or the ‘one’ is ‘that’ (tattvamasi), occurs in the the Na_sadi_ya hymns (RV X.129):

> There was then neither what is, nor what is not, there was no sky, nor the heaven which is beyond. What covered? Where was it, and in whose shelter? Was the water the deep abyss (in which it lay)?
>
> There was no death, hence was there nothing immortal. There was no light (distinction) between night and day. That one breathed by itself without breath, other than it there has been nothing.
>
> Darkness there was; in the beginning all this was a sea without light; the germ that lay covered by the husk, that one was born by the power of heat (tapas).
>
> Love overcame it in the beginning, which was the seed springing from mind, poets having searched in their heart found by wisdom the bond of what is in what is not.
>
> Their ray which was stretched across, was it below or was it above? There were seed-bearers, there were powers, self-power below, and will above.
>
> Who then knows, who has declared it here, from whence was born this creation? The gods came later than this creation, who then knows whence it arose?

> He from whom this creation arose, whether he made it or did not make it, the highest seer in the highest heaven he forsooth knows, or does even he not know?

The locus of the R.gveda is apparent from the nadi_su_kta (RV 10.90.11-2) which is interpreted by Prof. Maurer as follows: “Attend to this, my hymn of praise, O Ganga, Yamuna, Sarasvati,O Sutlej, Ravi! With Chenab, O Marudvr.dha (confluence of Ravi and Chenab?), with Jhelum, harken! You, O A_rjiki_ya, harken with Sus.oma.” This r.ca places Sarasvati between Yamuna and Sutlej (S’utudri_). It will bedemonstrated elsewhere that S’utudri_ and Yamuna were tributaries of the Sarasvati_ river at the time of composition of this r.ca. The land of the seven rivers with Sarasvati_ as sindhuma_ta_ was familiar to the r.s.is who composed the earliest part of the R.gveda. The land was from the Yamuna on the east to the Sindhu on the west, from the mountains of the north to the pan~canada_ in the south where s’u_dra and a_bhi_ra (perhaps counted among the pan~caja_ta_ or ‘five peoples’) lived.

इ॒त्था धीव॑न्तम् अद्रिवः का॒ण्वम् मेध्या॑तिथिम् ।

मे॒षो भू॒तो ऽ॒भि यन्न् अयः॑ ॥

शिक्षा॑ विभिन्दो अस्मै च॒त्वायूर् अ॒युता॒ दद॑त् ।

अ॒ष्टा प॒रः स॒हस्रा॑ ॥

8.002.40 You, thunderer, approaching in the form of a ram, have come to Medhya_tithi, one of the race of Kan.va, thus propitiating you. [In the form of a ram: S.ad.vim.s'a_ Bra_hman.a 1.1: the legend is also found in Ba_s.kala Upanis.ad; have come to: or, did carry off, ayah = agamayah].

8.002.41 Liberal Vibhindu, you have given to me four times ten thousand, and afterwards eight thousand. [Another translation runs thus: ‘We allot to thee, a hundred, ten thousand years, (2) two, (3) three, four (4) yugas.’ This is a reference to a cycle of 4, followed by 32, multiplied by 10,000 which is equivalent to 4,320,000,000 or 432 crores of years or 4 billion, 320 million years. Atharva Veda 8.2.21 notes that the day of Brahma is 432 crores of human years: ‘Let us make 100, multiplied by 10,000 over 432 human-years or 432 crore years**: s’atam teyutam ha_yena_ndve yuge tri_s’i catva_ri**

kr.n.mah The translation of Whitney reads: A hundred, a myriad years, two periods (yuga), three, four, we make for thee…].

Veda and Maha_bha_rata

Against this background information, the present Kaliyuga is estimated to have commenced at the midnight of the 17th and 18th February, 3102 BC. (The conclusion was also endorsed by Le Verrier, the discoverer of the planet Neptune).

The following table shows the positions of the planets on that day, as given in Su_rya Siddha_nta in comparison with the computations by astronomers Bently (*Hindu Astronomy*) and Bailly (*Astronomy Indienne*):

POSITION OF PLANETS AT THE MIDNIGHT (UJJAIN) OF 17th and 18th February, 3102 BC

Planet	Su_rya Siddha_nta D m s	Bently D m s	Bailly D m s
Jupiter	318 16 7	318 3 54	310 22 10
Saturn	281 36 18	280 1 58	293 8 21

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PLANET	Modern Mean Longitude	Modern True Longitude

This table shows the celestial longitudes of the planets relative to the star Zeta Piscium (Revati_ in Sanskrit) at sunrise on February 18, 3102 BC, the beginning of Kali-yuga. Each longitude is expressed as degrees; minutes [In the entire period from the start of Kali-yuga to 1990, only three ten-year intervals recorded an alignment that was as close as the one disclosed by this table].

The San:kalpa mantra recited at the beginning of a yajn~a or a religious rite reads: **'adya Brahman.ah dvitiya para_rdhe s'veta vara_ha kalpe saptame vaivas'vate manvantare as.t.a_vims'atitame kaliyuge kali prathama caran.e 5101 gata_bde…'** This states that the first 50 years (pratha para_rdhe) of Brahma's life have elapsed and the current time is the first day of the s'veta vara_ha kalpa or first year of the 52nd century. Out of this first day, 6 manvantaras have elapsed and the seventh of vaivasvata manvantara is in currency; out of this vaivasvata manvantara 27 maha_yugas have elapsed and out of the current 28th maha_yuga, one kritayuga, one treatayuga and dva_parayuga have elapsed the kaliyuga is in currency. Out of this present kaliyuga, 5101 years have elapsed.

The present chronology used as BC and AD had its origin in 753 BC when Rome was founded. The year had 304 days divided into 10 months. (Note the last four months named September, October, November, December which are derived from septem, octo, novem and decem, the Latin words connoting the 7th, 8th, 9th and 10th months). Julius Caisar in 46 BC added his name into the calendar as July month and Augustus Caesar added his name into the calendar as August month making the 12 months or 355 days of a year. The calendar then became the Julian calendar. To further synchronise the calendar with the solar calendar, in the year 1582 AD, Pope Gregori XIII introduced the leap year of 366 days every fourth year. In 1752 AD, the Gregorian calendar was adopted as the royal calendar of Britain whose empire solidified this BC/AD dating system.

The contrast between the present-day calendar and the Hindu calendar tradition is clear; the Hindu calendar, the counting of months and years is clearly based with reference to the actual position of the sun on the sky and the counting has been in vogue for over thousands of years in a continuous sequence. In fact, the

calendar goes beyond the counting of the earthly life and counts the creation of the universe itself with reference to the motions of the planets and the Milky Way. The Hindu astrological order of the planets is the Sun, Moon, Mars, Mercury, Jupiter, Venus and Saturn (the Hindu gift to the world of the names of week-days in that order). The expanded concept of nine planets includes the nodes of the moon: the ra_hu and ketu. The progress of the sun north or south of the ecliptic yield two ayana in a year. The southern ayana and the northern ayana constitute a night and a day, respectively, of the gods. Twelve thousand divine years, each composed of (three hundred and sixty) such days, constitute the period of the four yuga: krita yuga has 4,000 divine years, treta has 3,000 divine years, dva_para has 2,000 divine years and kali has 1,000 divine years. "The period that precedes a yuga is called a sandhya, and it is of as many hundred years as there are thousand in the yuga; and the period that follows a yuga termed the sandhya_m.s'a, is of similar duration. The interval between the sandhya and the sandhya_m.s'a is the yuga." (R. Shamasastry, 1912, *The Vedic Calendar*, Ganga Publications (Repr. 1979), New Delhi: p.78).

Section 9 R.gveda and Linguistic Area

R.gveda is not a treatise on the political economy of the Vedic Age

Let us begin with a quote from J. Gonda attempting to date the R.gveda and defining the locus of the hymns of the R.gveda:

"The sam.hita_s, bra_hman.as, a_ran.yakas and the earliest upanis.ads must for the greater part have existed in their present form before the rise of Buddhism in the second half of the 6th century BC and before the spread of the Aryan culture and the establishment of Vedic 'schools' in the South of India... The determination of the terminus a quo is closely connected with the beginning of the Indo-Aryan civilization and the vexed problem of the time at which the Aryans arrived in India. There is indeed no conclusive evidence of an earlier origin of any Rigvedic hymn (The completely untenable assumption that the R.gveda or part of it was composed in the period of the Indo-European unity; e.g. Griffith, H., RV. I, p. VII was rightly combated by Pischel-Geldner, V.S.I, p. XXII). Suggestions to determine the date of the R.gveda on the strength of presumed anti-Zoroastrian allusions in, or striking literary parallels between, some of its texts and passages in the Avesta which would point to proximity and a close chronological and cultural relationship are based on quicksand, because, besides the uncertain date of the Avesta, the cases of cultural, stylistic and lexicographical parallelism between texts of this description do not necessarily point to simultaneity... Nor can, in the opinion of the present author, reliable evidence be produced in favour of the supposition that certain parts of the R.gveda were composed in Iran or in the Indo-Iranian borderland... most of the hymns seem to have been composed in the country round the Sarasvati_ river, in the hilly and best parts of the Punjab (Hopkins, at *JAOS* 19, p. 19; A.C. Woolner, at *BSO(A)S* 6, p. 549). Althogh there is some difference of opinion regarding the identification of rivers mentioned in the texts, also because their courses have since considerably changed and their names have varied, the abundant references to mountains, the streams of the Indus system, etc. (For a survey: PL Bhargava, ***India in the Vedic Age***, Lucknow, 1956; 1971, p. 60) allow us in any case to say that the Rigvedic hymns have their origin in a region that was at a considerable distance from the Ganges. This river is mentioned only once, in a hymn in man.d.ala X which significantly is devoted to the laudation of the Indus and its tributaries. The great stream, frequently mentioned, made a deep impression on the poet: "On earth her roar is striving

to reach the vault of heaven; with brilliant light she dashes up unending surge. As if the streams of rain pour thundering from the cloud, The Indus onward rushes like a bellowing bull." (cf. the two poems addressed to the Sarasvati_ 7,95 f.) To the east the Aryans had not expanded beyond the Yamuna_ which is mentioned three times. They knew the high mountains in the north...Most hymns replete with mythology, but allusions to 'religious life' and the daily cult are much less in number... The chiefs and noblemen were leaders in war and were expected to order, and defray the cost of, the more expensive sacrifices... the poets, veiling their thoughts in mythical imagery, did not intend to describe their social, religious or political life or to supply us with objective information on concrete facts...The obscurity of considerable parts of the Veda, and especially the R.gveda, is largely due to our ignorance of the Vedic age in a general sense of the term, that is to say to our deficient knowledge of the cultural circumstances behind the texts and the intellectual equipment of the poets..." (J.Gonda, opcit, 1975, p. 20).

Some lexemes in the R.gveda (e.g. ni_ra, water; mi_na, fish; ara_l.a, high-curved horns) indicate an evolution from the substrate languages of India (for example, Mundarica and Dravidian). In R.gveda VII,18 which described the warfares of King Suda_s with clans listed as: Turvas'a, Matsya, Bhr.gu, Dr.uhyu, Paktha, Bhala_na, Alina, S'iva, Vis.a_n.in, Vaikarn.a, Anu, Aja, Sigru, and Yaks.u. It is a debatable issue if all these clans spoke different dialects of the Indic language.

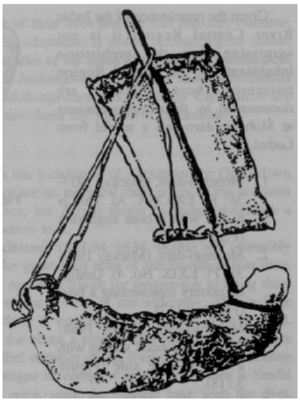
> "The most obvious fact about Sanskrit, or Old Indo-Aryan (OIA), when we are interested in its dialects, is that the records show large corpora in what are essentially two rather divergent dialects--Vedic and classical...Classical Sanskrit is a literary language written according to the book--that is Pa_n.ini's grammar, and following it more or less correctly. We find in it no dialects, no chronological development, except loss and at times invasion from the vernaculars of the users, and no geographical divergences. Vedic Sanskrit, however, is different. It is anything but a unified language, a language of one dialect only. It shows even within the oldest member of the corpus, the R.gveda, linguistic features that can be explained only by positing their origin in slightly differing dialects, and within the total Vedic corpus there is a sliding scale of clusters of dialectal features that run all the way from those that are most different from classical Sanskrit to those that are, in fact, taken by most scholars in the field to be essentially the dialect that

Pa_n.ini described as his norm...Pa_n.ini described, presumably, a dialect of Northwestern India (his birthplace S'ala_tura was there), and he is dated in the middle of the fifth century BC." (M.B. Emeneau, The Dialects of Old Indo-Aryan, in: Birnbaum, Henrik and Jaan Puhvel (Eds.), 1966, ***Ancient Indo-European Dialects***, Berkeley, University of California Press).

The locus of Vedic society and Harappan culture: Sarasvati Sindhu doab

Vedic society as evidenced from R.gveda is part urban, but substantially pastoral, maritime, with the knowledge of the use of metals and organized in a ra_s.t.ra composed of assemblies. There are also references to warfare and an extensive elaboration of mythological constructions around the process called yajn~a.

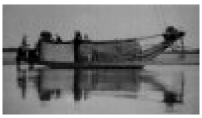
Rigvedic India was an area in the Punjab, an area of the **sapta-sindhu** (which is called **haptahindu** in Vendidad, a handbook of the Parsee, the first of 16 holy ands created by Ahuramazda), bounded between the Sindhu and the Sarasvati, bounded on the north by the Hima_laya. This is the same area where Harappan culture was nurtured. India is the only land where the Rigvedic traditions of fire-worship or yajn~a, are cherished even today, in a remarkable evidence of continuity. Rigvedic language is more akin to Sanskrit and other Indian languages than it is to any other language family of Europe.



Lothal; boat terracotta model (After Rao, 1985: 505, Pl. CCXX and CCXXIIIA). At Ras al junayz in Oman, there was a Harappan settlement; found at this site were pieces of bitumen with the impressions of reed bundles and ropes on one side and remains of barnacles on the other; these are taken to be indicators that caulking material was used on oceangoing craft from Harappan sites to Oman. (Cleuziou, S., Reade, J., and Tosi, M.,eds., 1989, *The Joint Hadd Project: summary report on the third season: October 1987-February 1988*. Rome: The Joint Hadd Project). These finds complement the evidence of cuneiform records of the period before the reign of Hammurabi (1792-1750 BC) with references to Meluhhhan boats. Sargon of Akkad (2334-2279 BC) boasted: “the ships from Meluhha, the ships from Magan,

the ships from Dilmun he made tie-up alongside the quay of Akkad." (translation by S.N.Kramer (1964:49) of the original inscription published in: Hirsch, H., 1963, Die Inschriften der Konige von Agade. *Archiv Fur Orientforschung*, 20:: 37-8).

Mesopotamia; maps depicting lines of contact with the east (After: PRS Moorey, 1994, *Ancient Mesopotamian materials and industries,* Oxford, Clarendon Press) The gulf and the sea-route to the Indus Valley. "Dilmun is often referred to both in economic and in literary texts, where it need have no reference to reality (Michalowski 1986: 133-5). When it does refer to a particular place, no one has subsequently overthrown Sir Henry Rawlingson's (1880) arguments in favour of the island of Bahrain, though scholars remain undecided how much else may or may not have been involved at various periods. The following items are listed as reaching Ur from Dilmun in the late third and early second millennium BC: lapiz lazuli, cornelian, and various other unidentified semi-precious stones; ivory and ivory objects; copper; silver; 'fish eyes' (pearls or agate); red gold; white corals; various woods; dates. Except for the dates and the 'fish eyes', if they were indeed pearls, all these commodities came to Dilmun from elsewhere for onward shipment." (cf. as Tilmun: Edzard et al. 1977: 157-8; Edzard and Farber 1974: 193; Groneberg 1980: 237).



Mohanna Houseboat (d.u_nd.i_ or ber-i_) (cf. Salma Sultana Begum, 1987, p. 185).



Silver model of a boat from the Royal Graves at Ur (***Antiquaries Journal***, Oct. 1928, pl. LXII; Crawford, H., p. 119) compared with a modern boat on the Tigris river.

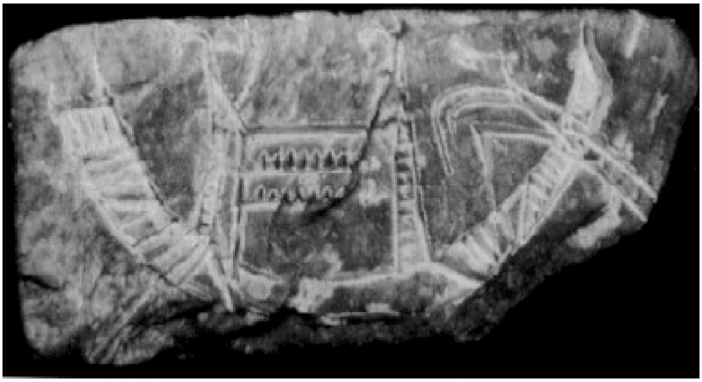
The maritime/riverine nature of the

Sarasvati Sindhu civilization is borne out by the archaeological finds of contacts with Sumeria, particularly in the trade of copper/bronze weapons exported from ancient India.

Maritime R.gvedic times

R.gveda has a number of allusions to the use of boats.

The vedic people had used ships to cross oceans: anarambhan.e... agrabhan.e samudre... s'ata_ritram na_vam... (RV. I.116.5; cf. VS. 21.7) referring to as'vins who rescued bhujyu, sinking in mid-ocean using a ship with a hundred oars (na_vam-aritraparani_m). There is overwhelming evidence of maritime trade by the archaeological discoveries of the so-called Harappan civilization, which can now be re-christened: Sarasvati-Sindhu civilization. Some beads were reported to have been exported to Egypt from this valley (Early Indus Civilization, p. 149); Sumerians had acted as intermediaries for this trade (L. Wooley , The Sumerians, pp. 46-47; cf. Ur Excavations, vol. II, pp. 390-396).which extended to Anatolia and the Mediterranean.



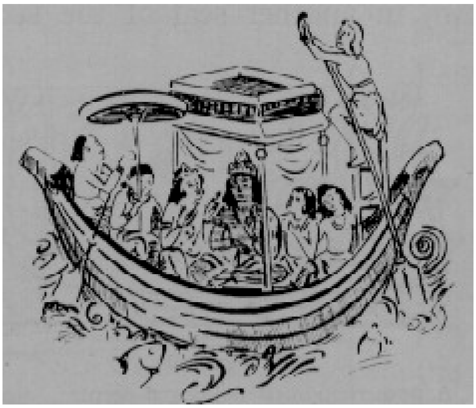
Shows a high-prowed, flat-bottomed boat with central cabin and large double rudder. The boat is comparable to the mohanna houseboats which ply even today on the Sindhu near Mohenjodaro. The central cabin has ladders to the roof with a high-seated platform at the stern from which the large rudder could be used. The boat is adapted to the shifting sandbars and slow-moving waters of the Sindhu and her tributaries.The back is broken along the lateral perforation but has an incised grid design on the remaining surface. (Unfired gray steatite; 3.33 cm. Long, 1.64 cm. Wide; Mohenjodaro DK 10355; Mohenjodaro Museum MM 489; Mackay, 1938, pl. LXXXIII.30; After Kenoyer, J.M., 1998, cat. No. 21; p. 90; fig. 5.18). "...this boat is shown as lashed together at both prow and stern indicating perhaps that it was made of reeds." (After Mackay, E.J.H., 1937-38, Pl. LXXXIX,A; cf. Pl. LXIX,4) "We have, however, found two representations of boats. One is roughly scratched on

a potsherd and apparently has two yards on its masts. The other is carved on a seal and the bindings of its hull suggest that this boat was made of bundles of reeds, as were so many contemporary craft of ancient Egypt. It is mastless, which perhaps indicates that it is a river boat. The one, if not two, uprights at either end of the cabin carry flags or emblems, and a seated steersman holds a pair of oar-like rudders, as on the modern Indus craft. This vessel, it is interesting to note, is singularly the one portrayed on the well-known Gebel-el Arak ivory knife handle, which, though found in Egypt, is thought to have been an importation, possibly from Elam. Of these boats the one with the mast could have been used for sea travel." (Mackay, E.J.H., 1934, The Indus Civilization: some connections with Sumer, Elam and the west. *Journal of the Royal Central Asian Society*, 21(3):420-423).

A boat with a similar design is noted in an Ajanta painting of the historical period:

Ajanta: a drawing based on an Ajanta painting (After Mookerji,R., 1912, *Indian Shipping A history of the sea-borne trade and maritime activity of the Indians from the earliest times*, Calcutta, Longmans, p. 42).

Boats drown in the river Sarasvati when the river was in spate (RV. 6,61,3); Devi Aditi comes in a boat for the reciters to board (RV. 10,63,10); Soma, the king of the waterways, who covers the universe as a cloth, has boarded the boat of sacrifice; the su_rya descends the heavens on a boat (RV. 1,50,4; 5,45,10; 7,63,4; 10,88,16,17). Sudasa built an easily pliable boat to cross the Purus.n.i



river (RV. 7,18,5); Agni is a boat which carries the sacrificers over the difficult path of sacrifice (RV. 1,9,7, 7-8: 5,4,9); Agni is the boat of the reciters in troubled times (RV. 3,29,1), to ford enemy lines (RV. 3,24,1); Agni is the carrier-boat of oblations to the gods (RV. 1,128,6); Agni is the boat of all wishes (RV. 3,11,3); Indra was like a ferry-boat (RV. 8,16,11); Indra protected the boats (RV. 1,80,8); Indra is invoked to carry the reciters over the ocean of misfortune (RV. 3,32,14); Indra takes the reciters in his boat across the ocean (RV. 8,16,11); Indra saved the ship-wrecked Naryam, Turvasu,

Yadu, Turviti and Vayya (RV. 1,54,6); Indra-Varun.a sail on the boat on the celestial ocean (RV. 7,88,3); Purus.an's golden boat moves on the sky (RV. 6,58,3) Varun.a's boat will carry the reciter on to the mid-ocean of the sky (RV. 7,88,3); Maruta helped the reciters to cross the ocean of war in a boat (RV. 5,54,4); Maruta was compared to a tempestuous ocean in which had sunk a laden ship (RV. 5,59,2); there are references to: house boat (RV. 1,40,12); long boat (RV. 1,122,15); well-furnished boat with oars (RV. 10,101,2); boats carrying foodgrains for overseas markets (RV. 1,47,6; 7,32,20; 7,63,4); boats fit to cross the ocean with oars (RV. 1,40,7); ocean-trading boats (RV. 1,50,2). [See also Swami Sankarananda, Hindu States of Sumeria, Calcutta, K.L.Mukhapadhyay, 1962 for the story of Bhujyu who was the son of a king named Tugra (a worshipper of As'vina) whose boat was sunk in the mid-ocean, p. 32].

Riches are obtained from the samudra (i.e. by maritime trade) (RV. 1,47,6); there were two winds on the ocean, one to put the boat to the seas and the other to bring it to shore (RV. 10,137,2).

The word, 'samudra', occurs over 150 times, of which about 60 occurrences are in Books I and X and 40 in Book IX. According to Sa_yan.a, the word means the ocean, 77 times, the firmament 37 times, som or its epithets 6 times (soma is stored in Indra's belly like samudra: RV 1.30.3), a soma-vat 5 times, a cloud three times, water or its epithets twice (RV 7.49 **samudrajyes.t.ha_h, samudra_rtha_h**), the sun twice. In a few instances, the word also is an epithet qualifying a deity. It is also called the vasati_vari_ waters in which soma flows. In a few glosses, Sa_yan.a gives two alternatives**: samudrontariks.am va_, samudro megho va_, kalas'oantariks.am va_**, i.e. samudra or firmament, samudra or cloud, samudra or vat or firmament. The RV 10.125.7: **mama yonirapsvantah samudre is explained as: samudravanyasma_dras'maya iti samudram su_ryaman.d.alam, yada_ samudravantyasma_d bhu_taja_ta_ni_ti samudrah parama_tma_**

Ya_ska provides 5 derivations for the word, 'samudra': firmament, samudravanyasma_da_pah (waters flow from it); ocean, samabhidravantyenama_pah (waters flow from it); sammodante asmin bhu_ta_ni (creatures find delight in it); samudako bhavati (water accumulates in it); samunatti (it makes the earth wet). The interpretation that 'waters flow from it' has given rise to the controversy about the meaning of the word, 'samudra'. Hopkins, Ragozin, Keith and Zimmer interpreted that the R.gvedic

people did not know about the ocean and the word mean the gushing and expansive stream of the lower course of the Sindhu river, after the river had received waters from her tributaries in the Punjab. This interpretation is based on the terms used in the R.gveda, such as: samudramiva sindhavah, samudra_yeva sindhavah. These terms can also be explained as descriptions of the vast expanse of the sindhu, like the expanse of the ocean.

RV 10.121.04, an invocation to ka, praja_pati, provides a poetic description of the snow-clad mountains from which many perennial rivers originate, the mountains are called the ‘ocean with the rivers’, samudra rasaya_ saha_huh:

यस्येमे हिमवन्तो महित्वा यस्य समुद्रं रसया सहाहुः ।

यस्येमाः प्रदिशो यस्य बाहू कस्मै देवाय हविषा विधेम ॥

10.121.04 Through whose greatness these snow-clad (mountains exist), whose property men call the ocean with the rivers, whose are these quarters of space, who are the two arms -- let us offer worship with an oblation to the divine Ka.

In RV 10.190.1, arn.ava is mentioned in addition to samudra so that a distinction is made between the firmament and the ocean. It is poetic description which equates firmament as the big ocean [arn.a = water (TS 4.2.4.2); flood, stream, wave (RV 5.50.4); arn.ava = billowy, agitated (RV 190.1); arn.avah = billowy flood (6.61.8); arn.as = wave, wavy stream (RV 1.4.12; agitated: RV 5.54.6)]:

ऋतं च सत्यं चाभीद्धात् तपसो ऽध्य् अजायत ।

ततो रात्र्य् अजायत ततः समुद्रो अर्णवः ॥

10.190.01 Truth (of thought) and truthfulness (of speech) were born of arduous penance, thence was night generated, thence also the watery ocean. [Penance: an allusion to the penance of Brahma_ preceding creation; tatah = from that penance, or from him (Brahma_); watery ocean: samudra = firmament and ocean (arn.ava)].

Macdonell held a different view (*Vedic Index*, vol. II, p. 432) and emphasized, “knowledge of the ocean was inevitable to the people who knew Indus”. Terms such as **samudra iva pinvate** (RV 1.8.7, 8.12.5) and **samudra iva paprathe** (RV 8.3.4), the surging of the ocean is described, an apparent reference to the

tides of the sea. Sa_yan.a's gloss: samudro yatha_ candrodayam pra_pya pinvate vardhate tatha_ (i.e. as the sea ebbs and flows in accordance with the changing phases of the moon).

In the passage (RV 7.95.2): **eka_cetat sarasvati_ nadi__na_m s'uiryati_ giribhya a_ samudra_**, there is an indication that the course of the Sarasvati_ had been followed right upto the meeting point with the ocean. In RV 1.71.7 all oblations go to Agni like the seven rivers going to samudra. Amiya Kumar Chakravarty added that the Vedic people knew not only the western Arabian Sea but also the eastern Bay of Bengal and concluded: "Therefore, from the term samudra in the R.gveda, except perhaps in some particular cases, where a big river has been meant—the truth of which again is open to considerable doubt—always means the ocean or the sea". (Amiya Kumar Chakravarty, Samudra in the R.gveda, *Indian Historical Quarterly*, vol. VIII, June 1932, pp. 353-357).

RV 9.33.6 notes **ra_yah samudra_ms'caturosmabhyam soma vis'vatah**; RV 10.47.2 refers to: **catuh samudram dharun.am rayi_n.a_m**; both these instances note the four oceans forming the four boundaries of the earth and the for the acquisition of wealth. The link between the treasures and the ocean is apparent in: RV 1.47.6: **rayim samudra_duta va_;** RV 9.97.44**: rayim ca na a_ pavasva_ samudra_t**. RV 10.5.1 describes samudra as the holder of the treasures; and in RV 6.69.6, Indra and Varun.a are referred to as 'samudrau' and asked to bring wealth.

Ocean-going vessels are referred to: RV 1.25.7: **veda na_vah samudriyah**

वेदा यो वीनाम् पदम् अन्तरिक्षेण पतताम् ।

वेद नावः समुद्रियः ॥

1.025.07 He, who knows the path of the birds flying through the air; he, abiding in the ocean, knows (also) the course of ships.

तं गूर्तयो नेमन्निषः परीणसः समुद्रं न संचरणे सनिष्यवः ।

पतिं दक्षस्य विदथस्य नू सहो गिरिं न वेना अधि रोह तेजसा ॥

1.056.02 His adorers, bearing oblations, are thronging round (him), as (merchants) covetous of gain crowd the ocean (in vessels) on a voyage ascend quickly, with a hymn to the powerful Indra, the protector of the solemn sacrifice, as wome (climb) a mountain. [Women climb a hill to gather flowers].

आ यद् रुहाव वरुणश् च नावम् प्र यत् समुद्रम् ईरयाव मध्यम् ।

अधि यद् अपां स्नुभिश् चराव प्र प्रेङ्ख ईङ्खयावहै शुभे कम् ॥

7.088.03 When (I, Vasis.t.ha) and Varun.a ascend the ship together when we send it forth into the midst of the ocean, when we proceed over the waters with swift (sailing vessels), then may we both undulate happily in the prosperous swing. [With swift sailing vessels: snubhis' cara_va gantri_bhir naubhih: with going, viz., ships; then may we both undulate: pra pren:kha i_n:khaya_vahai s'ubhe kam: pren:khe nauru_pa_ya_m dola_ya_m eva pren:khaya_vahai nimnonnatais taran:gair itas' cetas'ca pravicalantau san:kri_d.a_vahai, let us both sport, being tossed here and there by th e up and down waves, as it were in a swing, in the form of a ship].

As’vins help rescue Bhujyu, the king, who had fallen in the ocean during his maritime expedition.

युवं तुग्राय पूर्व्येभिर् एवैः पुनर्मन्याव् अभवतं युवाना ।

युवम् भुज्युम् अर्णसो निः समुद्राद् विभिर् ऊहथुर् ऋज्रेभिरश्वैः ॥

1.117.14 Dissipators of affliction, as you were praised with former praises by Tugra, so were you again adored (by him), when you brought Bhujyu safe from the tossing ocean with swift ships and rapid horses. [vibhih = swift naubhih (ships)].

RV 10.136.5 has a reference to the sun as traversing the eastern and the western ocean.

वातस्याश्वो वायोः सखाथो देवेषितो मुनिः ।

उभौ समुद्राव् आ क्षेति यश् च पूर्व उतापरः ॥

10.136.05 The steed of the wind, the friend of Va_yu, the Muni, who is instigated by the deity, repairs to both oceans, the eastern and the western.

RV 8.20.25 draws a distinction between samudra and sindhu, by referring sindhu (Indus), Asikni_ (Chenab) and samudra as separate entities:

यत् सिन्धौ यद् असिक्न्यां यत् समुद्रेषु मरुतः सुबर्हिषः ।
यत् पर्वतेषु भेषजम् ॥

8.020.25 Whatever medicament there may be in the Sindhu, the Asikni, in the oceans, in the mountains, Maruts, who are gratified by sacrifice
In RV 7.55.7 (sahasras’r.n:go vr.s.ab ho yah samudra_duda_carat), the sun is described as coming of the samudra. This imagery is continued in RV 10.72.7 which refers to the sun hidden in the ocean which was brought forth by dhe devagan.a:

यद् देवा यतयो यथा भुवनान्य् अपिन्वत ।
अत्रा समुद्र आ गूळ्हम् आ सूर्यम् अजभर्तन ॥

10.072.07 When, gods, you filled the worlds (with your radiance) as clouds (fill the earth with rain), then you brought forth the sun hidden in the ocean.
While the r.ca 10.66.1 interprets samudra as the atmosphere (i.e. a metaphor describing the ocean of the firmament), the word is used as distinct from sindhu and does not refer to the river Sindhu:

समुद्रः सिन्धू रजो अन्तरिक्षम् अज एकपात् तनयित्नुर् अर्णवः ।
अहिर् बुध्न्यः शृणवद् वचांसि मे विश्वे देवास उत सूरयो मम ॥

10.066.11 May the flowing Sindhu, the atmosphere, the firmament, Aja Ekapa_d, the rain-bearing thunder-cloud, and Ahirbudhnya hear my words; may the wise universal gods (listen to) my (praises).
Maruts carry treasures across the farther shore of the ocean and Indra’s chariot is unimpeded by samudras or parvatas (RV 2.16.3: na ks.on.a_bhya_m parimve ta indriyam na samudraih parvatairindra te rathah):

आ नो ऽवोभिर् मरुतो यान्त्व् अच्छा ज्येष्ठेभिर् वा
बृहद्दिवैःसुमायाः ।
अध यद् एषां नियुतः परमाः समुद्रस्य चिद् धनयन्त पारे ॥

1.167.02 May the Maruts come to our presence with benefaction; may they who are possessed of knowledge (come) with most excellent and brilliant (treasures), since their glorious horses, the Niyutas, gather wealth even on the

farther shore of the sea. [samudrasya cid dhanayanta pa_ra, bearing or collecting wealth, even on the farther shore of the sea; parasmin, on the other bank; metaphorically, the explanation is: winds bring wealth, i.e. rain, from the skirts of the horizon or firmament].
(G.V.Davane, An analytical study of 'samudra' in the R.gveda, in: *Golden Jubilee Volume*, ed. T.N. Dharmadhikari, Poona, Vaidika Sams'odhana Mandala, 1981, pp.46-51).

R.gveda has numerous references to sea or ocean which is usually called samudra but is also known by other names such as arn.ava and sindhu, the last wor having also the meaning of river and the river par excellence, viz. the Indus. In a number of passages not only sea but seas are mentioned. These allusions are full of so many details applicable to sea alone, that they would be senseless if taken to denote the lower course of the Indus. Thus a number of verses speak of rivers flowing towards the sea (RV. I, 71,7); and one verse speaks of the seven rivers going to the sea (RV. I.71,7). There are references to treasures of the ocean (RV. I.47,6; VII.6,7; IX.97,44) and to pearls called kr.s'anas (RV. I,35,4; X.68,1) whose shells are clearly mentioned in the Atharvaveda as won from the sea (AV. IV.10,1 and 3). There are references to the agitation of the ocean (RV. V.78,8), to high waves going over which in a ship was like swinging in a swing (RV. VII,88,3), and to the all pervading mist (RV. I.182,6). The vastness and depth of the ocean are described by such expressions as Vasis.t.ha's greatness deep like a sea (RV. VII.33,8), Indra spreading himself like a sea (RV. VIII.3,4), Indra vaster than heavens and floods of ocean etc. (RV. X.89,11), mention of islands surrounded by water (RV. I.169,3) (Bhargava, P.L., ***India in the Vedic Age*,** Lucknow, The Upper India Publishing House, 1971, pp. 70-72).

R.gveda has a number of allusions to the use of boats. Ships of the sea are mentioned (RV. I,25,7), profit-seekers go in company to the sea (RV. I.56,2; IV,55,6) and glory-seekers on the sea are referred to (RV. I.48,3). Bhujyu Taugra is celebrated as follows:

"Tugra, verily, As'vins, sent (his son) Bhujyu to sea, as a dying man parts with his riches; but you brought him back in vessels of your own, floating over the ocean and keeping out the water.
"O Na_satyas, you conveyed Bhujyu (and his men) to the sandy shore across the sea of water after they had sailed for three nights and three days in three

rapid-winged cars (i.e. ships having sails), having one hundred feet (i.e. oars) and six horses (i.e. masts).
"This exploit you achieved, As'vins, in the ocean, where there is nothing to give support, nothing to rest upon, nothing to cling to, that you brought Bhujyu, sailing in a hundred-oared ship, to his father's house." (RV. I.116-3-5)
"Dissipators of affliction, as you were praised with former praises by Tugra, so were you again adored (by him) when you brought Bhujyu safe from the tossing ocean in ships having wings (sails) and firm horses (masts)." (RV. I.117,14).
"O showerers (of benefits), you brought Bhujyu, who was drifting about, back to his ancestors in ships with self-yoked wings (i.e. sails)" (RV. I.119,4).

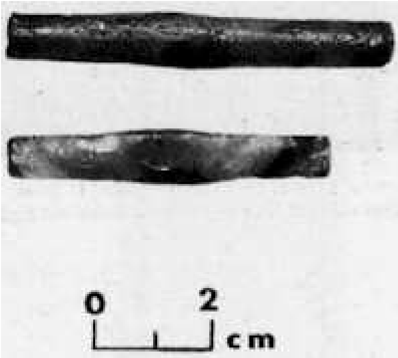
Two seas are called **arva_vat** and **para_vat** (RV. I.34,7; VIII.12,17; 13,15; 82,1; 97,4; IX.65,22; X.136,5; 137,2; 187,2).

> By referring to *para_vata sindhu* (RV 10.137.2) [para, para_vat as distinct from avaram arva_vat, 'on this side or proximate'] the hymn is referring to 'other side, distant' apparently speaking of Sindhu in geographic relation to Sarasvati. RV 3.54.6, 8 refers to two sisters who hold the two worlds from r.tasya-yoni (the womb or source of r.ta). This is perhaps a reference to the two rivers: Sarasvati (avara, near) and Sindhu (para, distant).

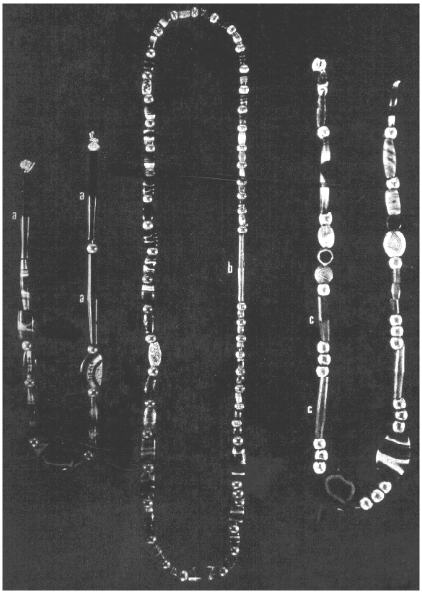
The vedic people had used ships to cross oceans: **anarambhan.e... agrabhan.e samudre... s'ata_ritram na_vam...** (RV. I.116.5; cf. VS. 21.7) referring to as'vins who rescued bhujyu, sinking in mid-ocean using a ship with a hundred oars (na_vam-aritraparani_m).

There is overwhelming evidence of maritime trade by the archaeological discoveries of the so-called Harappan civilization, which can now be re-christened: Sarasvati-Sindhu civilization. Some beads were reported to have been exported to Egypt from this valley (*Early Indus Civilization*, p. 149); Sumerians had acted as intermediaries for this trade (L. Wooley , *The Sumerians*, pp. 46-47; cf. Ur Excavations, vol. II, pp. 390-396).which extended to Anatolia and the Mediterranean.

One good example of goods exported from India to Mesopotamia is the 'long barrel cylinder bead'.



Chanhudaro: unfinished long barrel-cylinder beads; top:L 36.1507, bottom: 36.1564. Boston Museum of Fine Arts. (Dilip K. Chakrabarti, 1982, Pl. 24.1).



Ur. Royal Graves; long barrel-cylinder beads. Akkadian period. Bead ‘b’ is 6.4 cms. Long. (After Dilip K. Chakrabarti, 1982, Pl. 24.2). There are four unmistakably Indus long barrel-cylinder carnelian beads in the Beck collection in the Haddon Museum, Cambridge, from the Royal Graves at Ur. (Dilip K. Chakrabarti, 1982, Long Barrel-cylinder beads and the issue of pre-Sargonic contact between the Harappan Civilization and Mesopotamia, in: Gregory L. Possel, ed., *Harappan Civilization*, pp. 265-270).

Saptasvasa_ Sarasvati_

Sarasvati_ is called **saptathi_** (RV. VII, 36,6) and saptasvasa_ (RV. VI.61,10). She was a mighty river which swetp away a ridge of the hills with its mighty

waves (RV. VI.61,2) and moved with a thundering roar (RV. VI.61,8). To Sarasvati_ are devoted one complete hymn (RV. VI,61), parts of five hymns (RV. I,3; II,41; VII,95; 96; X,17) and several single verses in praise (RV. I,164,49; VI.52,6; VII,36,6; X.64,9 etc.). "The great king Yaya_ti Na_hus.a ruled on its banks (RV. VII.95,2) and the dynasty of his son Pu_ru continued to rule over the ancestral kingdom for generations (RV. VII.96,2). The Tr.tsus also ruled probably on the southern bank of this river and one verse clearly says that the Tr.tsu king Vadhryas'va got a son Divoda_sa by the favour of Sarasati_ (RV. VI.61,1). It was on its banks that a very large number of Vedic hymns were composed. That is why the Sarasvati_ is called the inspirer of good songs and promoter of good thoughts (RV. I.3,11). The importance of Sarasvati_ was not only political and cultural but also economic and strategic. It is called the prosperer of the five clans (RV. VI.61,12). It is described as a sure defence like a fort of iron and the slayer of the enemy (RV. VII.95,1). With such associations it is no wonder that this river is called holy (s'uci)(RV. VII.95,2), the best of mothers, the best of goddesses (RV. II.41,16) and the dearest among the dear ones (RV. VI.61,10). At the end of a long hymn the poet sums up the feelings of the A_ryas towards this river by praying to it not to let them go away from her fields to places not lovely like them. (RV. VI.61,14). ...In one verse of the R.gveda S'aryan.a_vat is associated with Sus.oma_ river and soma is said to grow there. (RV. VIII.64,11)...S'aryan.a_vat sea was situated in the northern Saptasindhu. (Bhargava, P.L., ***India in the Vedic Age***, Lucknow, The Upper India Publishing House, 1971, pp. 62-63).

The Great Epics, **Maha_bha_rata** and **Ra_ma_yan.a** show the spread of Vedic culture to the east and the south.

RV. VIII,25,4 (**mahanta_ mitra_varun.a_ samra_ja deva_vasura_**) refers to Mitra and Varun.a as Deva_ (gods) and Asura_ (demons), anticipating a conflict between two sections of the people to be elaborated in the bra_hman.as and pura_n.as: one section worshipped the divinity as Deva and the other as Asura; this is evident from an anecdote in **Maha_bha_rata**; the king of Devas was Yaya_ti; he had married the daughters of two Asuras: S'armis.t.ha_, daughter of king Vris.aparvan who was a disciple of the priest S'ukra; and Devaya_ni, daugher of the priest Us'anas-S'ukra.

Roots of this Rigvedic India should, therefore, be sought within the Sarasvati-Sindhu doab.

Harappan Cultural Style. (ca. 3000 to 1300 BC). The conventions of building, art style, and technology were remarkably uniform in hundreds of sites. The evidence of writing was only on seals and tablets and inscriptions on copper plates and weapons. Technology had advanced in the areas of weights and measures, brickmaking, in gold, silver, bronze and copper work and in beads of varieties of stones. The underlying basis of the economy was agriculture and animal husbandry; sites are located close to sources of water, preferably in the flood plains of the major rivers, Sindhu and Sarasvati. Only very few large sites, perhaps only four or five, which may be called cities are found.

Indo-European Languages and farming

The following section is based on:

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[See References at the end of Bibliography].

“Introduction

The question of how Indo-European family of languages came to occupy a broad swathe of Europe and western Asia has long attracted discussion. The actual range that the Indo-European family of languages had achieved by early historical times is uncertain, but they were certainly present in central and northern Europe, southeastern Europe, Anatolia and parts of the Near and Middle East. Celtic, Germanic and Slavic migrations may have provided a relatively late overlay of Indo-European languages in parts of western and northern Europe, though without written records of the pre-existing languages it is impossible to say what what widespread before then. Migrations and conquest may likewise have carried Sanskrit and Tocharian further eastwards shortly before early historical times. While acknowledging that these identifiable movements of cultures and peoples contributed to the later spread of the Indo-European languages, scholars have long discussed what events before this time might have led to this group being present widely through central, northern, south-eastern Europe

and the Near and MIddle East.
Recent discussion of the prehistoric spreading of the Indo-European language group has generally concentrated on two alternative sets of hypotheses. On one hand there is the view that migrations of war-like cultures (e.g. the 'Kurgan' or 'Battle-Axe' Culture) (Childe 1950, Gimbutas 1980) had spread the languages out from a common point of origin through conquest of relatively passive farming populations. A more recent alternative view (Renfrew 1987, 1992) is that the main event in the spread of the Western Branch of these languages was the initial spread of farming out of the Near East, providing a population 'wave' (due the increased carrying capacity of the farming lifeway) that swamped out the languages of hunter-gatherer groups, speaking non-Indo European languages, that had previously existed in the area. This idea has received some support from genetic evidence of a south-east to north-west gradient in gene marker frequencies across Europe (Cavalli-Sforza et al. 1994.), which has been taken to be the legacy of the 'farming wave' that spread out of Anatolia beginning around 9,000 BP. The genetic evidence from the 'farming wave' has been disputed however, on the grounds that other (earlier or later) population movements could have followed the same track.

While both the 'Battle-Axe' and the 'Farming Wave' hypotheses have much to merit them, it is important to bear in mind that they may not be the only reasonable explanations in terms of what is known of the pre-history of Europe and western Asia, against a background of emvironmental changes. The possibility that the initial dispersal event of the Indo-European languages involved not neolithic farmers nor bronze-age warriors, but mesolithic hunter-gatherers has been mentioned briefly by several authors (e.g. Renfrew 1987). However, none seems to have given the idea more than a passing thought. Here we aim to discuss this idea in greater depth, examaining what is known of the climate record and the archaeological record, together with general ecological principles of populations, to determine whether this hypothesis stands up to more detailed analysis.

How languages may spread due to climate instability

The last 100,000 years have been marked by large numbers of dramatic climate oscillations (van Andel & Tzedakis 1996), each of which would

have been capable of causing changes in human population density as the resource base shifted. Episodes of relatively low population density, for example during intense cold and dry phases, would have been followed by rebound periods in which humans could expand in range and in numbers across the region.

As well as acting as a source of genetic shifts in population composition, the 'sampling error' caused by contraction of populations, followed by exponential expansion of populations out from refuge areas, could tend to provide waves of linguistic and cultural uniformity to spread across the region. Just such a wave of population out of the Near East may have carried Indo-European languages across much of Europe and part of the way eastward into central Asia.

Following a climate phase marked by low human population densities across the region, any one group that acquired both the general cultural traits that caused it to spread rapidly out of a refugium, and the technology to enable it to do so, would have experienced rapid exponential population growth in an environment relatively free from competition by other hunter-gatherer groups. Such a group, spreading out northwards and westwards, and possibly eastwards as well, would make a disproportionate contribution to the genetic and linguistic legacy of Europe and parts of the Near East.

Other groups even a few centuries slower in expanding their range and populations in tune with the climate change would have become numerically dominated by the earlier colonists as they left their refugial homelands, given the likely exponential growth rate of each population. Even at the relatively low densities that hunter-gatherer populations would have been capable of achieving, competition or at least interaction between groups would eventually have become more frequent, with less abundant (non- Indo-European speaking) groups much more likely to lose their cultural and linguistic identity among a larger wave of Indo-European speakers. This scenario, of separate refugial populations which failed to expand fast enough to dominate linguistically, may explain the existence of the Basque language group, as a 'potential' European dominant that narrowly failed to expand out before the Indo-European speakers became abundant in central and eastern Europe, south-eastern Europe and possibly also most other parts

of Europe. The extinct Etruscan, Ligurian and Iberian language groups may be regarded a further examples of the same. As the hypothetical Indo-European wave spread out in each direction, it can be expected to have 'gathered up' the genetic and linguistic legacy of scattered smaller populations it encountered along its way, as each of these began a slightly later spread out of southern European refugia. This process of 'gathering up' may explain some of the current east-west and north-south genetic gradients which now exist in Europe, and some of the differences between the present-day branches of the Indo-European family of languages.

It is thus possible that much of the initial (mid-Holocene) range of the Indo-European languages across central and northern Europe, the Balkans and the Near East was achieved by the rapid spread of a 'sparse wave' of hunter-gatherers, out of either southern Europe, the Levant, Anatolia or western Asia, preceding the 'farming wave'.

The potential importance of the Younger Dryas cold phase

An obvious candidate for an environmental change which could result in rapid and widespread change in languages, cultures and genetic composition of human populations is the Younger Dryas cold event (about 10,800-10,000 14C years ago) which returned much of western Asia to cold semi-desert conditions (Huntley & Birks 1983, Starkel 1991, Landmann et al. 1996, Rossignol-Strick and Planchais 1992, Velichko 1993), apparently through a series of rapid stepwise cooling events. The transition to the Holocene is marked by noticable changes in technologies (to the Mesolithic) and in human skeletal morphology across this region, possibly suggesting an immigration event. Reviewing the evidence for different hunter-gatherer carrying capacities in different environments, Steele et al. (1998) suggest that temperate forest and moist steppe have a much higher overall carrying capacity than either semi-desert or arctic environments.

Based on a range of different sources of environmental evidence, Rossignol-Strick (1995) suggests that in many areas of Greece and across Turkey, the Younger Dryas period was even more arid than the most extreme part of the last glacial, with semi-desert predominant. Conditions across most of the rest of Europe are variously thought to

have resembled open dry forest steppe or possibly (at some stages) semi-desert (Starkel 1991). *A priori*, such conditions may be expected to have resulted in some change in human population densities and distribution, though it is difficult to demonstrate or disprove this idea, given the limitations in the archaeological record for the Younger Dryas period. In Europe and most of the Near East the record of human occupation during the Younger Dryas is ambiguous, with the 'age plateau' in radiocarbon ages adding to the confusion (10,000 years ago in radiocarbon terms can mean anything between 11,200 to 12,200 'real' years ago). In northern and central Europe, the record is perhaps detailed enough to suggest a complete or almost complete depopulation during the Younger Dryas. However, in the Levant conditions seem to have remained relatively moist (Rossignol-Strick 1995), with relatively strong signs of continuity in human settlement (the Natufian) (Henry 1989). Even in this area, for instance in the Jordan Valley, aridity and a large decrease in food plants are accompanied by more restricted human populations clustered around relatively moist 'oases' (Wright 1993). Following the Younger Dryas, warm, moist Holocene conditions seem to have returned rapidly all across Europe and western Asia, taking only a few decades according to the latest ice core indicators of regional climate (Taylor et al. 1997). Given the magnitude of the change in environments across the region, the earlier rapid climate transition (about 12,000 14C y.a., or 14,500 ca. y.a.) *into* the much colder, arid Younger Dryas could well have eliminated much of the previous late Palaeolithic population of northern and central Europe, or at least drastically reduced inland population densities, and (from available indications of the carrying capacity of temperate forest environments for hunter-gatherers: Steele et al. 1998) the rapid return of warm conditions would have provided an opportunity for rapid human population expansion to fill this gap.

If one takes Renfrew's view that such dating is unreliable, then an earlier divergence relating to hunter-gatherer recolonization after the Younger Dryas may be more plausible for a spread of Indo-European languages by this type of mechanism (this is especially so considering the large amplitude and very sudden nature of this event). Renfrew (1987, 1992) has vigorously attacked the techniques of linguistic dating and has found broad support among archaeologists, if not among linguists. He makes the point that linguistic dating (based on degree of

similarity in vocabulary, and the use of specific 'technology' words to pin down the culture of the earliest Indo-Europeans) is in itself potentially subject to great imprecision.

Around a factor of two error in the estimate of rate of divergence, taken from the earliest written records, would be sufficient to push the point of common origin back several thousand years from the early-to-mid Holocene to the earliest Holocene. Given that during this time there has been a drastic cultural change, to relatively sedentary Neolithic farming (in addition with lesser cultural changes in trade patterns and technology), all across the region and one must ask whether the linguistic chronology is accurate across such a change in group size, inter-group interaction and cultural complexity. One can suggest that for instance (M. Fraser pers. comm.) relatively mobile hunter-gatherer populations moving across large distances of the European continent would have retained their cultural and linguistic unity more readily than denser and more sedentary farming populations.

We do not claim that this particular hypothesis has any more to merit it than either the 'battle-ax' hypothesis or the 'farming wave' hypothesis, merely that it should be seriously considered (given the uncertainty over the early linguistic history of the region) alongside these as another possible scenario. Further light might be shed on this matter if and when the archaeological record of the region improves, allowing this hypothesis to be subject to more rigorous testing. For example, good evidence of a strong depopulation of most of Europe and western Asia during all or part of the Younger Dryas or the early Holocene cold phase would lend support to it, while lack of any depopulation may be seen as evidence against this.

A plethora of population waves in the Late Glacial and Holocene?

The post-Younger Dryas colonization hypothesis is only one of a range of potential scenarios, suggested by the paleoenvironmental and archaeological record, leading to the spread of Indo-European languages, or higher-order language groups such as the paired Indo-European/Uralic familes, or the still broader and more heterogenous Nostratic superfamily.

Another similar candidate event that might have affected the spread of IE by either hunter-gatherers or early farmers (or both) is the widespread cold, dry event at 8,200 cal. y.a. (Table 1.). This event seems to have been about half-way as severe as the Younger Dryas (Adams et al. 1998), to have come on (and also ended) over at most a few decades, lasting in total about 200 years. Here again, a decline in human population densities across much of the region seems plausible from the extent and the sudden-ness of this event. Turnover in population or in cultural identity among hunter-gatherers resulting from this disruption might well have initiated or added to the spread of the Indo-European languages.

Estimates of the linguistic chronology of the Indo-European languages have been used to suggest that much of their common vocabulary has a more recent origin (about 7,000 years ago) (Swadesh 1972) than the early Holocene divergence that this 'sparse wave' hypothesis (and Renfrew's 'farming wave' hypothesis) would seem to require (about 10,000-11,000 years ago). In this sense, the more likely candidate is the later, less severe cold event 8,200 years ago.

It is also necessary to bear in mind the possibility (though it conflicts still more strongly with the linguistic dating) that the population increase causing the initial phase of spread the Indo-European languages occurred at the earlier warming event at the end of the Last Glacial Maximum (about 14,500 'calendar' years ago), with the onset of the Younger Dryas itself, or perhaps even earlier events (Otte 1994). One can also envisage a range of scenarios combining aspects of the three hypotheses (the 'battle-axe, the 'farming wave' hypotheses, and the 'sparse wave' idea presented here). Quite independent of climate change, a more effective 'Mesolithic' technology might directly have lead to a population 'wave' of increased carrying capacity analagous to that associated with the Neolithic transition. As pointed out above, another major cold and arid event - lasting perhaps 200 years - affected Europe and western Asia around 7,400 14C y.a./8,000 cal. y.a. (Alley et al. 1997) (Table 1.).

At different stages all three processes ('sparse wave', 'farming wave' and 'battle-axe migrations') might coincidentally have tended to spread the Indo-European language group. An initial early Holocene 'sparse wave'

spread of the Indo-European languages may have been followed by a period of relatively long-distance cultural and linguistic exchange (with possible spreading of innovations in the language, continually 'updating' aspects of the general substratum of Indo-European languages; *sensu* Sherratt 1996) by relatively mobile hunter-gatherer groups, and later farming and warrior groups.

A major refuge of population in the Europe-west Asian region during the Younger Dryas seems to have been the general area around the Jordan Valley, where populations clustered in moist sites where wild nuts and grains could be gathered. It is interesting to consider that this region, having the general characteristics of a source region for a 'sparse wave' of hunter gatherers, was also a key source for the 'farming wave' of Neolithic farmers. The Indo-European Languages might thus have been propelled out of this source region by two successive population waves, first the faster wave of hunter-gatherers, and then a slower wave of farmers.

The idea that a phase of colder, dryer conditions might have led to a regional decline in population density depends crucially on the cultural habits and cultural flexibility of the hunter-gatherer inhabitants of the region. One might hypothesise (as mentioned above) that an opening-up of the returning woodlands due to cold and/or aridity would have favoured hunting of large animals, enabling an increase in population density. This could merely push the dating of the necessary population wave slightly further back in time. However, animal protien is not a principal source of food outside arctic and coastal environments, so it would be unlikely to result in anything other than a net decrease in population elsewhere as the plant food availability from wild grasses and nut-bearing trees declined with a shift towards cold steppe and semi-desert conditions. The upshot of the complexity of human behaviours is that different cultural groups of humans might have responded to the same change in opposite ways, and such a pattern of simultaneous decline of one group and expansion of another may produce a pattern of linguistic spread. In any caser, overall population density seems likely to have declined during cold, arid events and the archaeological evidence from the Near East supports this.

Thus, if climate events were fast and intense enough to significantly disrupt hunter-gatherer (and/or farming) populations, they may have been responsible for population or cultural replacements which helped to spread languages. Since the most intense events (the Younger Dryas and the 8,200 y.a. cold event) precede the Neolithic across most of the Europe/Near East region, hunter gatherers may have been the vectors of the Indo-European languages.
This is merely speculation, but it is necessary to set out the range of possible scenarios in order to show that the situation in the region could well be more complex than has generally been thought. From considering the very variable environmental record of the Late Glacial and Holocene, it seems that there would have been ample opportunities for population and cultural/linguistic replacement quite unrelated to agriculture or migrations of warriors on horseback.

Conclusion

The paleoenvironmental record suggests various times over the last 15,000 years at which major changes in hunter-gatherer population density *could* have occurred on a regional scale, due to environmental changes. Such population shifts would be difficult to detect in a sparse archaeological record subject to large 14C anomalies, but they remain a distinct possibility given the magnitude of the climate and ecological changes recorded from across the region. While the ending of the Younger Dryas event seems particularly likely to have resulted in population waves spreading across the region within the approximate time range of the origin of Indo-European languages, any one of these prehistoric changes could have initiated the spread of the Indo-European language group (and in a broader sense the linked Indo-European/Finno-Ugric group). Given the existing dating and the detailed linguistic analysis which suggests a divergence time around 7,000 cal. y.a., a somewhat later climate change (early-to-mid Holocene; e.g. the 8,200 cal. y.a. or the 5,900 cal. y.a. cold events; Table 1.) would seem to rest more easily with observations. An 8,200 y.a. change could have promoted spread of Indo-European languages by either hunter gatherers, farmers, or both.

Alternatively, climate change might have had little or no role in the actual spreading of the languages, by farmers or post-neolithic warriors.

Different processes could coincidentally have aided the spread of the Indo-European language family at different times. It may be that an initial 'sparse wave' of recolonizing hunter-gatherers carried this group of languages part-way into central Europe and western Asia, with later processes such as the spread of farming and migrations of warrior cultures having resulted in a further net spreading of this group of languages.

The purpose of the paper has been to advocate and discuss a fairly speculative hypothesis (that climate change promoted spread of IE languages by causing changes in population density of hunter-gatherer groups) which may be difficult or impossible to test. Given the *a priori* case which can be made, this 'sparse wave' hypothesis seems fairly plausible, although like the 'farming wave' hypothesis of Renfrew the contradictions with paleolinguistic analyses can be seen as a weakness. The severity of this weakness is uncertain, however, as Renfrew (1987, 1992) has pointed out various grounds on which paleolinguistics can be doubted.

The general hypothesis that past climate changes strongly affected linguistic patterns can also merge into more traditional explanations; sudden climate change could have been the primary cause of migrations of IE-speaking neolithic farmers or horse-riding warriors. If one accepts th paleolinguistic view that such 'technology' words as 'wheel' and 'copper' were initially present at the point of divergence of Indo-European languages, and that they actually applied to technology items such as a fully-formed wheel or worked copper, then the 8,200 y.a. or the 5,900 y.a. climate events (rather than the Younger Dryas) could have been more important, respectively influencing migrations of farming groups or of horse-riding warriors.

Thus we must conclude on a rather defeatist note: the fact that one can so readily add and interchange alternative hypotheses concerning the spread of the Indo-European languages (and other language groups, all of which have formed in the highly variable world of the Late Quaternary period) should perhaps be seen as reason for scepticism regarding any prospect of understanding the true nature of the initial process of spread of the Indo-European languages. Nevertheless 'finding out what one does not know' is a vital part of the scientific

process; it is always better to realise that there are grounds for uncertainty than to hold an unfounded belief that one knows the answer. This uncertainty gives reason for open-mindedness as to the true causes of the spread of IE, rather than any sharp division into entrenched views.

TABLE 1. Sudden large climate changes and stable climate phases in Europe/Near East during the last 15,000 calendar years, from Adams (1998). Sources of evidence include pollen, animal fossils, marine, lake and ice cores, and general sedimentology. It is generally thought likely that many or most of these changes occurred on a timescale of several decades or less (Adams et al. 1998).
14,500 y.a. - rapid warming and moistening of climates. Rapid deglaciation begins.
13,500 y.a. - Climates at least as warm and moist as today's
13,000 y.a. 'Older Dryas' cold phase (lasting about 200 years) before a partial return to warmer conditions.
12,800 y.a. (+/- 200 years)- rapid stepwise onset of the cold, dry Younger Dryas.
11,500 y.a. (+/- 200 years) - Younger Dryas ends suddenly over a few decades, back to warmth and moist climates (Holocene, or Isotope Stage 1)
9,000 y.a. - 8,200 y.a. - climates warmer and often moister than today's
about 8,200 y.a. - sudden cool and dry phase lasting about 200 years, about half-way as severe as the Younger Dryas.
8,000-4,500 y.a. - climates generally slightly warmer and moister than today's. (but; at 5,900 y.a. - a possible sudden and short-lived cold phase corresponding to the 'elm decline').
Since about 4,500 y.a. - climates fairly similar to the present
2,600 y.a. - relatively wet/cold event (of unknown duration) in many areas “

R.gveda and Avestan

It is notable that the term **airya** occurs only in the Yas't, Vendidad, and Bunda_his'n and does not occur in the Ga_tha_s and the oldest fragments of Avesta. Yas't, Vendidad and Bunda_his'n refer to a region called Airyanem Vaejjah. The Hom Yasna which may be older than Vendidad and Bunda_his'n and includes prayers and rituals, refers to Airyanem Vaejjah as the homeland of Zarathus'tra. Geiger notes that the term airya connoted the totality of the population of Iran. Linking the term to the root, ar, he says: "This name probably indicates the nation as that composed of the Noble, the True, and the Pious, for they believed every virtue and every desirable and praiseworthy quality to be the peculiar heritage of their tribe…" (W.Geiger, *Civilization of the eastern Iranians in the ancient times, with an introduction on the Avesta religion*, Vol. I, Ethnography and Social Life, London, Henry Froude, 1885, p. 2.109). Vendidad is the purificatory code of the Parsis and includes a list of sixteen lands created by Ahura Mazda and harassed by Angra Mainyu's serpent and the winter. (J. Darmesteter, *The Zend Avesta*, Part I, Vendidad, p. lxxxiv). The firste of these sixteen lands is Airyanem Vaejjah on the banks of river Daitya. [?Daitya = Daryai Ru_d which flows from Mt. Savala_n (Sebi_la_n) in Azerbaijan, northward into Aras or Araxes river: A.V. Williams-Jackson, *Zoroaster: The prophet of ancient Iran*, New York, Macmillan, 1899, p. 194). Other lands include: Areia (modern Hari_ru_d or Haroyn or Old Persian Haraiva); Haptahendu (Saptasindhu). Bunda_his'n mentions the river Daitik and mountain Kondras to describe Airyanem Vaejjah which is in the direction of Ataro pataka_n (Persian Aturopatene; or, Arabic Azerbaijan). (J.Darmesteter, ibid., Bunda_his'n. XX.7 ff.; XX.13). "The winter arrives in the Aira_n-Veg on the auspicious day A_taro of the month of Din…with much cold; on this account they kindle a fire everywhere on the day A_taro of the month Din, and it forms an indication that winter has come. (The day is identified as ninth day of tenth month by Wust." (J.Darmesteter, Bunda_his'n, p. 95, fn.3; loc.cit. Malati J. Shendge, *The Aryas*, Delhi, Abhinav Publications, 1996, p. 13).

"The Creation. Ahura Mazda spake unto Spitama Zarathustra, saying: 'I have made every land dear to its people, even though it had no charms whatever in it…The first of the good lands and countries which I, Ahura Mazda, created, was the Airyana Vaego, by the Vanguhi Daitya. Thereupon came Angra Mainyu, whi is all death, and he counter-created the serpent in the river and Winter, a work of the Devas. There are ten winter months there, two summer

months; and those are cold for the waters, cold for the earth, cold for the trees…The second of the good lands…was the plain which the Sughdhas inhabit…The third…strong, holy Mouru…The fourth…beautiful Bakhdhi with high-lifted banners…Angra Mainyu…counter-created the ants and the ant-hills…The fifth…Nisaya, that lies between Mouru and Ba_khdhi…The sixth…the house-deserting Haroyu…The seventh…Vaekereta, of the evil shadows…Angra Mainyu…counter-created the Pairika Kna_thaiti, who clave unto Keresa_spa…The eighth…Urva of the rich pastures…The ninth…Khnenta which the Vehrkanas inhabit…The tenth…beautiful Harahvaiti…Angra Mainyu…counter-created…the burying of the dead…The eleventh…bright, glorious Haetumant. The twelfth…Ragha of the three races…The thirteenth…strong, holy Kakhra…Angra Mainyu…counter-creatged the cooking of corpses…The fourteenth…the four-cornered Varena, for which was born Thraetaona, who smote Azi Daha_ka…The fifteenth…the Seven Rivers…The sixteenth…land by the sources of the Rangha, where people live who have no chiefs…Angra Mainyu…counter-created Winter, a work of the Devas." (J.Darmesteter, opcit.)

The list of Avestan divinities and corresponding Rigvedic divinities are:

Ahura Mazda asura medha
Mithra mitra
Verethreghna Vr.traghna (Indra)
Xwarenah Svarn.ara or Svarbha_nu (RV 5.40.5-9) (Su_rya)
Wa_yu Va_yu
Wa_ta Va_ta
A_tar atharvan
Tishtrya Tis.ya (a_ditya) or Trita
Haoma soma
Rashnu r.s.a_n.a
Aradwi_ su_ra ana_hita_ Ararindhu (Soma), Sarasvati_
Sraos'a S'raos.at. (call)
Frawashis Prava_si (Exiled)
Nanghaithyas Na_satya

In the Abn Yas't, (For 'abn' the concordant Sanskrit lexeme is a_pah, water), Aredwi_ Su_ra_ Ana_hita_ is '…the Heavenly river who feeds, so to speak, all the other rivers and streams of world", a goddess of fertility, war and a patroness of the palace and of the heroes. (W.W. Malandra, *An introduction to*

ancient Iranian religion, readings from the Avesta and Achaemenid inscriptions, Minneapolis, University of Minnesota Press, 1983, pp. 117-9). In Sanskrit, a_hita means an agnya_dha_nakarta_, a sacrificer, who maintains the perpetual sacred fire in a family; a_hita_gni means one who has placed (ahita) the sacred fire upon the altar. In AV. xi.7.8, agnya_dheya is a reference to placing the fire on the sacrificial fireplace. Thus, ana_hita_gni refers to one who has not performed the Agnya_dha_na.

होता यक्षद् वनिनो वन्त वार्यम् बृहस्पतिर् यजति वेन उक्षभिः

पुरुवारेभिर् उक्षभिः। जगृभ्मा दूरादिशं श्लोकम् अद्रेर् अध त्मना ।

अधारयद् अररिन्दानि सुक्रतुः पुरू सद्मानि सुक्रतुः ॥

1.139.10 Let the invoker (of the gods) offer sacrifice, and may they, desirous of the offering, (partake of) the acceptable (libation); Br.haspati himself, desiring (the libation), celebrates worship with libations; with copious and excellent libations. We catch from a distant quarter the sound of the stones, whereby the performer of pious acts has of himself secured the waters (of the clouds); the performer of pious acts (has secured) many habitations. [atmana_ adha_rayad ararinda_ni (ararinda_ni dhvasmanvat--Nirukta 1.12.16= vr.s.ti laks.an.a_nyudaka_ni atmana_ dharayati, he sustains by himself the waters, that is, the rains; or, he produces such waters by his sacrifices, tadr.s'an.yudakam ya_gena utpa_dayati, rain being the result of worship. Pious acts: sakratuh = yajama_na or Br.haspati, as the adhvaryu, or ministering priest]. [ararindha = arari = Soma; a vessel used in preparing the Soma juice, adha_rayadararinda_ni sumratuh, vr.s.t.ilaks.an.a_nyudaka_ni; ararih ces.t.a_ tatprada_na_ni].

Thus, aradwi sura_ ana_hita_ is a reference to Soma juice which is not offered in agnya_dha_na. This is an apparent reference to the soma substitute, a plant used in lieu of electrum as a sacrificial ritual after the movements of people away from the maujavanta from where soma could be obtained in earlier times.

Mun~javat.a is close to Kuruks.etra and Sarasvati_ river:

tato mun~javat.am na_ma maha_devasya dhi_matah
upos.ya rajani_meka_m ga_napatyamava_pnuya_t

> **kuruks.etrasya taddva_ram vis’rutam pun.yavardhanam pradaks.in.amupa_vartyam bra_hman.a_nbhojayettatah** (Va_mana Pura_n.a. Sm. 13.38 and 41).

Close to Plaks.a_vatarn.a< Vr.ddhakanyaka_, mun~javat.a acquired the position of the gate to Kuruks.etra together with the nis.a_dara_s.t.ra (cf. MBh. Vana 130.3-4).

Association of the river Sarasvati_ with the reeds is noted in a tributary named S’aradan.d.a_ or S’ara_vati_, which join Markanda river which in turn is identified with the ancient course of the Sarasvati_ river. S’ara_vati_ (S’aradan.d.a or Sadadeni)-Arun.a_-Markanda meet Thanesar-Pra_ci_ Sarasvati_ and flow near Pr.thu_daka (Pehoa). S’aradan.d.a_, Markanda and Arun.a_ are all treated as tributaries of Sarasvati_ river. Cf. MBh. S’alya 42.24: (ii): arun.a_ma_naya_ma_sa sva_m tanum bharatars.abha (Sarasvati’s own form is Arun.a_ and is brought into being by Sarasvati_).

s’ara_vati_ is noted as the boundary between the Pra_cya and udi_cya (uttara_patha) divisions of Bharat, in a verse quoted by Ka_s’ika on Pa_n.ini 1.11.75, Ks.i_rasva_min’s commentary on Amarakos’a 2.1.6-7 and Haradatta on A_pastamba Dharmasu_tra 2.7.17.17:

> **pra_gudan~co vibhajate ham.sah ks.i_rodake yatha_**
> **vidus.a_m s’abdasiddhayartham sa_ nah pa_tu s’ara_vati_**

Amarakos’a described the region to the north of the S’ara_vati as northwest and that to its south as east:

> **lokoyam bha_ratam vars.am s’ara_vatya_stu yovadheh**
> **des’ah pra_g daks.in.ah pra_cya udi_cyah pas’cimottarah** (Sharma Haradutt, ed., Pune, 1941, 2.7-8).

Uttara_patha is located on the other side of Pr.thu_daka in Ka_vyami_nma_m.sa_ of Ra_jas’ekhara. (Sharma Kedaranath, ed., Patna, 1954, ch. 17, p. 227).

Frawashis may refer to exiled people (or, deceased souls, pitr.s) and is a term derivable from Sanskrit pravas, to go abroad, to be exiled (TMB 18.1.1,

vra_tya_m pravasantam, an apparent reference to the emigration of vra_tyas); pravasatha = prava_sa, departure, separation from (RV. 2.28.7).

मा नो वधैर् वरुण ये त इष्टाव् एनः कृण्वन्तम् असुर भ्रीणन्ति ।

मा ज्योतिषः प्रवसथानि गन्म वि षू मृधः शिश्रथो जीवसे नः ॥

2.028.07 Harm us not, Varun.a, with those destructive (weapons), repeller (of foes), demolish him who does evil at your sacrifice; let us not depart (before our time) from the regions of light; scatter the malevolent, that we may live.

विभिर् द्वा चरत एकया सह प्र प्रवासेव वसतः

8.029.08 Two (the As'vins), travel with swift (horses) along with one (bride Su_rya), like travellers to foreign countries. [prava_sa = living abroad without wife; pra prava_seva vasatah; prava_si_ = exiled].

वधीद् इन्द्रो वरशिखस्य शेषो ऽभ्यावर्तिने चायमानाय शिक्षन् ।

वृचीवतो यद् धरियूपीयायां हन् पूर्वे अर्धे भियसापरो दर्त् ॥

त्रिंशच्छतं वर्मिण इन्द्र साकं यव्यावत्याम् पुरुहूत श्रवस्या ।

वृचीवन्तः शरवे पत्यमानाः पात्रा भिन्दाना न्यर्थान्य् आयन् ॥

6.027.05 Favouring Abhya_vartin, the son of Ca_yama_na, Indra destroyed the varas'ikha (people), killng the descendants of Vr.ci_vat, (who were stationed) on the Hariyu_pi_ya, on the eastern part, while the western (troop) was scattered through fear. [Abhya_vartin, Ca_yama_na: names of ra_ja_s. Vr.ci_vat is the first-born of the sons of varas'ikha, thereafter others are named. Hariyu_pi_ya is the name of either a river or a city].

6.027.06 Indra, the invoked of many, thirty hundred mailed warriors (were collected) together on the Yavya_vati_, to acquire glory, but the Vr.ci_vats advancing in a hostile manner, and breaking the sacrificial vessels, went to (their own) annihilation. [Thirty hundred: trim.s'ac chatam varmin.ah = trim.s'ada dhikas'atam, one hundred and thirty; kavacabhr.tas, wearers of breasplates or armour; yavya_vati_ = same as hariyu_pi_ya].

Sa_yan.a is uncertain about the place named Hariyu_piyua_: **ka_cinnadi_ka_cinnagari_**.

Alternative rendering of RV 6.27.4-6 (Griffith):

This one great power of thine our eyes have witnessed, wherewith thou slewest Varas'ikha's children\When by the fierce of thy descending thunder, at the mere sound their boldest was demolished.In aid of Abhyavartin Cha_yama_n Indra destroyed the seed of Varas'ikha At Hariyu_piya_ he smote the vanguard of the Vr.chi_va_ns, and the rear fled frightened.Three thousand, mailed, in quest of fame, together, on the Yavyaa_vati_, O much sough Indra,Vrichivan's sons, falling before the arrow, like bursting vessels went to their direction.

Thus, this is an account of an onslaught faced by a group, perhaps coming from the right bank of Ravi by the armed men of Vr.ci_va_n who were unable to cross the river to reach Hariyu_piya_ on the left bank of Ravi also known as Yavya_vati_, U_rn.a_vati_ or Parus.n.i.

इन्द्रं वर्धन्तो अप्तुरः कृण्वन्तो विश्वम् आर्यम् । अपघ्नन्तो अराव्णः ॥

9.063.05 Augmenting Indra, urging the waters, making all our acts prosperous, destroying the withholders (of oblations). [Making all our acts prosperous: i.e. making Soma propitious for the sake of our rites].

ब्रह्म गाम् अश्वं जनयन्त ओषधीर् वनस्पतीन् पृथिवीम्पर्वताअपः ।
सूर्यं दिवि रोहयन्तः सुदानव आर्या व्रता विसृजन्तो अधि क्षमि ॥

10.065.11 Generating food, cows, horses, plants, trees, the earth, mountains and waters, elevating the sun in heaven, munificent, promoting sacred observances upon the earth, (they abide everywhere). [Generating food: brahman = vr.dh to sustain, foster].

These two r.cas seem to indicate that the Soma yajn~as was spreading throughout many lands. There is no reason to dispute the westward migration of the people living on the banks of the Sindhu and Sarasvati Rivers after the desiccation of the Sarasvati_ River which provided the principal means of

transport for copper ore and products from the Ahar and Ganeshwar regions of the Khetri copper mines.

Na_nghaithyas of Avesta are Na_satyas of R.gveda (RV. 4.3.6: friendly, truthful, helpful, satyasya netre; and RV 1.34.9 Asvins)

कद् धिष्ण्यासु वृधसानो अग्ने कद् वाताय प्रतवसे शुभंये ।

परिज्मने नासत्याय क्षे ब्रवः कद् अग्ने रुद्राय नृघ्ने ॥

4.003.06 Why repeat it when exalted in holy ceremonies? why tell it to the mighty, benevolent, circumambient, truthful wind? why, Agni, to earth, why to man-destroying Rudra? [To man-destroying Rudra: rudra_ya nr.ghne, the man-slayer, Rudra, the slayer of wicked men].

क्व त्री चक्रा त्रिवृतो रथस्य क्व त्रयो वन्धुरो ये सनीळाः ।

कदा योगो वाजिनो रासभस्य येन यज्ञं नासत्योपयाथः ॥

1.034.09 Where, Na_satyas, ae the three wheels of your triangular car? where the three fastenings and props (of the awning?) When will be the harnessing of the powerful ass, that you may come to the sacrifice? [trivr.to rathasya = tribhiras'ribhir-upetasya rathasya; the front of the car is the apex and the back of the car is the base forming three angles; ra_sabha = gardabha, ass; ra_sabha_vas'vinoh, two asses are the steeds of As'vins].

In Zamyad Yas't (8.45.52), there is a reference to the glory (hvarano_) which cannot be seized. This is comparable to Skt. Svar, the light of sovereignty. This is the heavenly glory which makes an earthly god, the king.(C. Bartholomae, *Altiranisches Worterbuch*, Berlin, Walter de Gruter, 1961, cols. 1847-48). One who possesses hvarano_ reigns; one who loses it falls. (J. Darmesteter, Vendidad, pp. lxii-lxiii and lxiii, n.1). Azi Daha_ka (Skt. Ahi dasya) is the fierce snake, a three-headed dragon who attempts to steal hvarano_. A_tar (Skt. Atharvan), son of Ahura (Skt. Asura) chases away Azi Daha_ka and recovers the sovereign light. The fight for the light is also a theme which occurs in Rigvedic hymns. The light which Indra won for the a_ryas (jyotira_rya_ya) is vais'va_nara agni.

मूर्धा दिवो नाभिर् अग्निः पृथिव्या अथाभवद् अरती रोदस्योः ।

तं त्वा॑ दे॒वासो॑ ऽजनयन्त दे॒वं वैश्वा॑नर॒ ज्योति॒र् इद् आर्या॑य ॥

1.059.2 Agni, the head of heaven, the navel of earth, became the ruler over both earth and heaven; all the gods engendered you, Vais'va_nara, in the form of light, for the venerable sage. [This is the first verse of a tr.ca to be recited on the day of the equinox. Agni is the head of heaven, as the principal element; Agni is the navel of earth, as its main source of support. A_rya_ya may refer to Manu as the institutor of the first sacrifice or to the yajama_na, the institutor of the present rite].

Avesta notes that Haoma (Soma) grew primarily on the mountains, on Haraiti. There he offered sacrifice to Sraos'a, Drvaspa and Mithra (Yas't 9.17; 10.88; YS 10.10; 8.19) and from the height, holy birds bore him everywhere to the Iskata Upairi-saena and starosara mountains. (Gray, *The Foundation of the Iranian religions*, p. 83). RV 10.123 also associates the eagle, falcon birds with the bringing of soma. The reference to Haraiti may be a reference to Haraquaiti, Sarasvati_. [One identification of Haraiti is with Elburz to the south of Caspian sea; but the reference to mountains points towards Kashmir and there are no indications that gandharvas hailed from Elburz, Caspian sea.] *Cambridge History of India* [ed. E.J. Rapson, Cambridge, 1922, p. 51] identifies Gandara as the region of Peshawar in the NW Frontier Province and Rawalpindi in the Punjab. Some (e.g. Zimmer) consider that south of Kubha_ upto its mouth in the Sindhu and east of the Sindhu may also have constituted Gandara. (Macdonell and Keith, *Vedic Index*, vol. I, p. 219). Hillebrandt and Zimmer identify Mujavant (which produces Soma: RV 10.34.1) as a mountain in the lower hills of the southwest of Kashmir. Soma is grown on the mountains (parvata_vr.dh: RV 9.46.1). [The reference to parvata_, mountain is an indication that soma refers to an ore, electrum, quartz containing gold and silver].

The abode of the Gandharva and the Apsaras is the sea (AV. 2.2-3). Apsaras are subjects of Soma Vais.n.ava and An:girasa, their Veda. (Gandharvas are subjects of Varun.a and Atharvan was their Veda: S'B 13.4.3.7,8). Gandharvas are masters and guardians of the Soma process. (apa_m gandharvam somam: RV 9.86.36; gandharvas guard the place of soma: RV 9.83.4). The king soma lived among the gandharvas (AiBr. 1.27: …va_c is with the gandharvas; but she returns as soon as the cferemony of the anipran.ayana is performed). The country of the gandharvas) is defined in the Ra_ma_yan.a (7.100.10-11) as the

country on both sides of the Sindhu (sindhorubhayatah pa_rs've des'ah) which is protected by gandharvas who are armed. That gandharvas are armed is also mentioned in the r.ca RV. 10.123.7. Ga_ndha_ris are the people of Ga_ndha_ra (RV. 1.126.7) Gandharvas are associated with Indra, Varun.a and Soma:

त्रीणि राजाना विदथे पुरूणि परि विश्वानि भूषथः सदांसि ।

अपश्यम् अत्र मनसा जगन्वान् व्रते गन्धर्वाँअपि वायुकेशान् ॥

3.038.06 Royal Indra and Varun.a, embellish the three universal sacrifices (and make them) full (of all requisites) for this celebration; you have gone to the rite, for I have beheld in my mind, at this solemnity, the gandharvas with hair (waving) in the wind. [The gandharvas: gandharva_n va_yukes'a_n: the gandharvas are the guardians of the Soma, somaraks.aka_n; similar beings are cited in Taittiri_ya: sva_nabhra_ja_n, bambha_re, hasta, suhasta, kr.s'a_n.ahete vah somakrayan.a_s, ta_n raks.adhvamma_ vo dabhan].

अमन्दान् स्तोमान् प्र भरे मनीषा सिन्धाव् अधि क्षियतो भाव्यस्य ।

यो मे सहस्रम् अमिमीत सवान् अतूर्तो राजा श्रव इच्छमानः ॥

उपोप मे परा मृश मा मे दभ्राणि मन्यथाः ।

सर्वाहम् अस्मि रोमशा गन्धारीणाम् इवाविका ॥

1.126.01 I repeat with a (willing) mind, the unreluctant praises of Bhavya, dwelling on th ebanks of the Sindhu; a prince of unequalled (might), desirous of renown, who has enabled me to celebrate a thousand sacrifices. [Bha_vya = Svanaya, his son; sindhu adhi = upon the Sindhu, either the river Sindhu or the sea-shore].

1.126.07 Approach me, (husband); deem me not immature; I am covered with down like a ewe of the gandha_rins. [This is Lomas'a's reply. [This and previous verse are brought in abruptly and in a different metre; perhaps, these hymns echoe some ancient popular song]. 'Hole me nevertheless therein, do not believe that I have a few hair. I am all haired just like a sheeop of Ga_ndha_ris' (Geldner).

जानन्तो रूपम् अकृपन्त विप्रा मृगस्य घोषम् महिषस्य हि ग्मन् ।
ऋतेन यन्तो अधि सिन्धुम् अस्थुर् विदद् गन्धर्वो अमृतानि नाम ॥
अप्सरा जारम् उपसिष्मियाणा योषा बिभर्ति परमे व्योमन् ।
चरत् प्रियस्य योनिषु प्रियः सन् सीदत् पक्षे हिरण्यये स वेनः ॥
नाके सुपर्णम् उप यत् पतन्तं हृदा वेनन्तो अभ्य् अचक्षत त्वा ।
हिरण्यपक्षं वरुणस्य दूतं यमस्य योनौ शकुनम् भुरण्युम् ॥
ऊर्ध्वो गन्धर्वो अधि नाके अस्थात् प्रत्यङ् चित्रा बिभ्रद् अस्यायुधानि ।
वसानो अत्कं सुरभिं दृशे कं स्वर् ण नाम जनत प्रियाणि ॥

10.123.04 The pious, knowing his form, praised him, for they followed the city of the great deer; approaching hm with sacrifice, they reached the flowing (water), for the sustainer of the waters knows the ambrosial (fluids). [Great deer: i.e., Vena, whose cry is the thunder; sustainer of the waters: gandharva].

10.123.05 The Apsaras, smiling affectionately like a wife at her lover, cherishes him in the highest heaven; she wanders in the abodes of her beloved; he, Vena, being loved, sits, down on his golden wing.

10.123.06 Those desiring you in their hearts contemplated you travelling as a strong-winged bird in the sky, the golden-winged messenger of Varun.a, the bird which nourishes (the world) in Yama's dwelling.

10.123.07 The Gandharva_ stood erect upon the firmament, brandishing towards us his wonderful weapons, investing all in his beautiful diffusive (form), they make them visible, like the sun he generated the precious (rains).

The eloquent one knowing its form, hankered (after it)_ because they agred in the roar of the buffalo ani8mal. Going by the right way (r.ta) they havfe ascended the Sindhu. The Gandharva had found the immoirtal names.

The young woman, the apsara, bears her lover in the highest heaven smiling to him. As a darling he goes into the womb of the beloved. This seer (Vena) sits on the golden wing.

When they saw you as a bird flying to the heaven, perceiving with their hearts, the golden-winged messenger of Varun.a, in the seat of Yama, the hastily flying one.
The gandharva had raised himself in the sky bearing his variegated weapons. He clothed himself in a fragrant garmentg good to look at like the sun and brought his dear name to appearance. (Geldner).

The Avestan references to Harahvaiti (Skt. Sarasvati_), as distinct from the Seven Rivers and Haetumant (Afghanistan: Helmand) is notable. Harahvaiti is a name of a region (Arachosia) derived from the earlier name of the river Sarasvati_; Hravats are the name of a people and it is likely that the Croats is a term derived from this as westward migrations continued away from the Sarasvati River basin, perhaps after the desiccation of the river ca. 1900 to 1500 B.C. It should, however, be noted that Harappan artifacts and sherds are rare in the Helmand sites and while this lack of evidence may preclude cultural interactions during the mature periods, there is a possibility that they were related communities as a result of migrations from the desiccated Sarasvati River and during the travels to Bactria to fetch mineral resources.

Lamberg-Karlovsky notes two types of interaction between cultures, “primary incorporation by colonization’ and ‘secondary involvement’ and explains these types of interaction using the evidence of Harappan site of Shortugai and seals found in Altin Depe and Tepe Yahya: “The recent discovery of Indus sites in the vicinity of Shortugai near the Oxus river represents not only the furthest northern expansion of the Mature Indus Civilization but a clear colonization of that indigenous area (H.P. Francfort and M.H. Pottier, 1978, Sondage Preliminarie sur l’Establissment Proto-historique Harappan et Post-Harappan du Shortugai (Afghanistan du N.E.), *Arts Asiatique*s, 34: 29-86).

“The excavators of the sites have suggested that the colonization of these northern settlements brought about by the desire of the Indus Civilization to exploit resources (copper) and control the trade of lapis lazuli. Additionally it can be pointed out that several of the Early Harappan sites were recoccupied (colonized?) by the Mature Indus Civilization. Thus, the direct stratigraphic superposition of Mature Indus occupations over the local indigenous cultures at Kalibangan, Kot Diji, Amri, Bala Kot etc., indicate that following primary urbanization (the Early Harappan) these sites were directly incorporated into the cultural system of the Indus Civilization. Evidence for ‘secondary involvement’ with the Indus Civilization can be documented through the

presence of undoubted Indus material remains in areas beyond its direct geographical expanse.

“Thus the discovery of Indus seals, one with an inscription, at Altin Depe in Central Asia (Masson, V.M., 1977, Proto-Indian Seal from Altin Tepe, *Vestnik Drevnii Istorii* 31: 147-55) or the presence of an Indus inscription impressed on a sherd from Tepe Yahya (Lamberg-Karlovsky, C.C., The Proto-Elamites on the Iranian Plateau, *Antiquity* 52 (205): 114-20) are rare, even unique finds, but indicate a distant communication with these areas. There is little evidence, however, to suggest that these isolated finds, helpful only in establishing a time-space framework, indicate important social, political or economic communication with these areas.”. C.C. Lamberg-Karlovsky, Sumer, Elam and the Indus, in: Gregory L.Possehl, ed., *Harappan Civilization*, 1982, p. 65). This type of northern movement of Harappan peoples may ultimately explain the presence of ‘Indo-Aryans’ in Mitanni.

Geldner indicates the probability that the arrangement of the vedic corpus and codification should have been before ca. 600 BC (Geldner, V.S. III, p. 144; cf. Scheftelowitz, Apokryphen, p. 5f; C.G.Kashikar, at 13 AIOC, p. 44; loc.cit. J.Gonda, 1975, ***Vedic Literature (Sam.hita_s and Bra_hman.as),*** Wiesbaden, Otto Harassowitz). Ya_ska indicates that this occurred when the power of oral reproduction began to decline (Nir. I,20).

The language of Avesta is analysed as a branch of Indo-Iranian (Aryan) subfamily of the Indo-European language family. Zoroastrianism was a religion formed ca. 7th-6th century BC and has left a record called the Ga_thas which are sermons and appeals to Ahuramazda who was the supreme deity personifying the kind and creative element of life.

Avesta is a part of a larger literature preserved by the Magu-priests. Part of this text is in a dialect close in form (but with Persian phonetics, vocabulary and inflexion) to the R.gveda. The translation of Avesta is in a part called Yasna, which corresponds to yajn~a, 'worship', of the yazata-gods (now the i_zad). The Avesta contains 17 poems, called ga_tha_...in elaborate metres, indicating probably a long artistic development. These poems are of the Zoroastrian tradition, Zoroaster being the messenger of the Creator Ahura Mazda_. "But the exact interpretation struggles with obscure cultic terminology and a

language full of isolated words, and at times largely ambiguous syntax."(cf. H.W. Bailey, A Half-Century of Irano-Indian Studies, ***JRAS***, 1972, No. 2).

"The Avesta knows the beginning or source of the Aryans as Airyana Vaejo (Pahlavi Iran-Vej). The Avestan Vaejo corresponds to the Sanskrit bi_j meaning 'beginning or source'. The Avesta describes it as a place of extreme cold that became over-crowded (Vend. I. 3-4; II. 8-18). ... Whether the Mitannian kings (1475-1280 B.C.) on the upper Euphrates were a direct offshoot of the Aryans or not their names are certainly Aryan, for example Saussatar, Artatama, Sutarna, Tusratta and Mattiuaza (H. Oldenburg: in *Journal of the Royal Asiatic Society*, 1909, p. 1094-1109)... Mattiuaza, in his treaty with the Hittite king Aubbiluliuma signed in 1380 B.C. at Boghazkoy, invokes not only Babylonian gods to witness the treaties, but Mitra, Varun.a, Indra, and Na_satya in the form in which they appear in the R.gveda (S. Konow: Aryan gods of the Mitani people, 1921, pp. 4-5). They occur in the treaty as ila_ni Mi-it-ra-as-si-il ila_ni A-ru-na-as-si-il In-da-ra ila_ni Na-sa-at-ti-ya-an-na. Since the form for Na_satya is quite different in the Avestan language (Naonhaithya) it is argued that the Mitannian did not speak Iranian but Indo-Aryan (E.Meyer: Sitzungsberichte der K. Preuss. Akad. der Wissen, 1908, I, p. 14f.)... The name for 'fire' in the Persian Avesta is quite different, being atar, and this does not occur in the Indian Veda except in the Vedic proper name Atharvan, which corresponds to the Avestan name of the fire priest. Agni, as a messenger between gods and man, was known to the Vedas as Nara_-s'amsa. This corresponds with the Avestan messenger of Ahura, Nairyo_-sangha. (R.A. Jairazbhoy, 1995, Foreign Influence in Ancient Indo-Pakistan, Karachi, Sind Book House). [Note the use of the word san:ga in the Sumerian substrate language to connote a priest. san:ghvi_ (G.) means a priest leading the pilgrims.]

By early third millennium BC, the Sindhu Sarasvati doab was teeming with settlements which had known metallurgy, a system of weights, town-planning and also the use of inscriptions to conduct trade in an extensive contact area.

In the region of Shortugai, near Aikhanum, northern Afghanistan on the confluence of Oxus-Kokcha rivers, there is a cluster of seven ancient settlements. (Lyonnet, Bertille, 1977, 'Decouverte de Sites L'age du bronze dans le NE d l'afghanistan: leurs rapports avec la civilization de l'indus, in: *Annali deli' Instituto Orientale* di Napoli, Vol. 37 (NS XXVII), pp. 19-35). "Its

location is so strategic that it must have controlled the import of lapis lazuli, turquoise, silver and other minerals and metals from Afghanistan and Soviet Central Asia and northern Iran required for the highly industrialized economic pursuits of the Harappans. Similarly the discovery of Manda—a site in the Himalayan foothills on the Chenab in District Jammu, near the modern town of Akhnoor (Joshi, J.P., Interlocking of Late Harappa Culture and Painted Grey Ware Culture in the light of Recent Excavations, in: *Man and Environment*, Vol. II,1978, pp. 98-100)—should be taken as a highland site controlling the inflow of Himalayan timber for the Harappans. Sites like Bhagatrav on the western coast must have provided semi-precious stones like agate, carnelian and chalcedony for Harappan bead-making factories. Metals, minerals and timber of northern Baluchistan must have come to the lowlands through a number of sites including Gumla and Rehmandheri in the Gomala valley...Significantly enough, a site, Kulhade-ka-johad (lit. Axe place), near Ganeshwar in the Khetri copper mine area in Rajasthan has yielded typical Harappan inverted 'V' shaped arrowheads (Agrawal, R.C., 1978, Copper celts and an Indus arrow-head from Kulhade-ka-johad, District Sikar, Rajasthan, *Man and Environment*, II: 123)

...Mesopotamian texts clearly refer to three different designations for…tamkarum (merchant), samallum (agent or helper of merchant) and mari sipri (messenger employed in the trade for the transport of letters and merchandise (Leemans, W.F., 1960, *Foreign Trade in the Old Babylonian Period*, Leiden, p. 142). " (Shashi Asthana, 1979, Indus-Mesopotamian Trade: nature of trade and structural analysis of operative system, in: D.P. Agrawal and Dilip K. Chakrabarti, eds., *Essays in Indian Protohistory*, pp. 31-47).

The relative chronology of Avestan and R.gveda may be surmised from some references in the relatively older texts, the Ga_tha_s:

R.gveda il.a_yas pade_, 'in the footprint of (personified) libation' (RV 3.23.4) is compared with the Gav. pada_is' i_zaiia_, 'with the footsteps of (personified) libation'; the latter is attested in Y. 50.8: mat. va_ pada_is' ya_ irasru_ta_ i_z'aiia pairi jasa_i, 'I wish to approach you with the footsteps which are proclaimes as those of libation'. Humbach Helmut notes that here, 'the Avesta passage presupposes knowledge of the Vedic myth of Manu and his divine daughter Il.a_, the personified libation, in whose footprints ghr.ta was left. This myth is referred to in RV 10.70.8 and is recounted in detail in S'B. 1.8.1.1-26 (yadeva_syai ghr.tam pade samatis.t.hata tasma_d a_ha

ghr.tapadi_ti). The comparison of the Ga_thic word link with the R.gvedic one thus provides us with an insight into an Aryan concept and shows us that elementary p0reforms of the ritual mythology so typical for the R.gveda are to be assumed already for the Aryan period. At the same time it becomes evident that the Ga_thic expression could not be interpreted correctly before its R.gvedic prarllels were discovered and adduced. As both R.gveda and the Ga_tha_s draw on a common Aryan poetic tradition they also have many points of concurrence as far as formal poetics are concerned."(H. Humbach, *Die Ga_tha_s des Zarathustra*, 1-2, Heidelberg, 1959, 1, p. 67; 2, p. 83 and 85).

तिस्रो॑ देवीर् ब॒र्हिर् इ॒दं वरी॑य॒ आ सी॑दत चकृ॒मा वः॑ स्यो॒नम् ।

म॒नु॒ष्वद् य॒ज्ञं सुधि॑ता ह॒वींळि॑ दे॒वी घृ॒तप॑दी जुषन्त ॥

RV 10.070.08 Sit down, you three goddesses, upon this broad barhis, we have spread it out for you; Il.a_, radiant (Sarasvati_) and bright-footed (bha_rati_) accept our sacrifice and well-presented oblations as if they were Manu's.

(Humbach Helmut, Contribution of Vedology to Zoroastrian Studies, in: *Golden Jubilee Volume*, ed. T.N. Dharmadhikari, Poona, Veda Sams'odhanamandala, 1981, pp. 114-120).

Darmesteter suggests that the Indo-Iranian language had three words to designate gods: asura, *yagata and *daiva (i.e., respectively: lord, one to whom one should offer sacrifice, shining). In later Iranian, dae_va underwent a change in meaning. In R.gveda, prayers exist for one to be saved from harm, deva_na_m uta martya_na_m. In Avestan, prayers exist for heroes to be saved from harm, dae_vanam uta mas'yanam. (James Darmesteter, *Ormazd et Ahriman, leurs origins et leur histoire*, Bibliotheque de l'ecole des hautes etudes, 29th fascicle, Paris, F. Vieweg, 1877, pp. 2645-6).

Medhira = medha_vi_, wise (RV 1.25.20); medha_ = wisdom, insight (RV 1.165.14: ma_nyasya medha_); medhya = wise, deserving oblation, entitled to the fruit of a sacrifice (RV 5.1.12: kavaye medhya_ya; TS 7.5.25.1: yo va_ as'vasya medhyasya s'iro veda medhyo bhavati 'yajn~aphalayogyo bhavati'); pavitra, pure (a_ medhya_d bhavito; medhyu – longing for a sacrificial meal

(RV 4.38.3: medhayu na s'u_ram, san:gra_mecchum; medhasa_ti – receivingt the oblation (RV 1.129.1).

त्वं विश्वस्य मेधिर दिवश् च ग्मश् च राजसि ।

स यामनि प्रति श्रुधि ॥

1.025.20 You, who are possessed of wisdom, shine over heaven and earth, and all the world; do you hear and reply (to my prayers), with (promise of) prosperity.

आ यद् दुवस्याद् दुवसे न कारुर् अस्माञ् चक्रे मान्यस्य मेधा ।

ओ षु वर्त्त मरुतो विप्रम् अच्छेमा ब्रह्माणि जरिता वो अर्चत् ॥

1.165.14 Since the experienced intellect of a venerable (sage), competent to bestow praise upon (you), who deserve praise, has been exerted for us; do you, Maruts, come to the presence of the devout (worshipper), who, glorifying (you), worships you with these holy rites.

ayaman.am br.haspatimindram da_na_ya codaya
va_tam vis.n.um sarasvati_m savita_ram ca va_jinam

Mayrhofer notes the meaning of asurah = powerful; m. lord, later on: evil spirit, demon = Avestan ahuro, master. He indicates the derivation of the word asura from asuh meaning life force and queries if asurah should be seen in the parts (-a)s's'ura found in the treay texts from Mitanni, and Nuzi tablets. (W. Mayrhofer, *A Concise Etymological Dictionary of Sanskrit*, Vols. I-III, I, p.65).

Evaluating the occurrences of the term 'ahura' in the Avesta (apart from the occurrences of ahura as part of the name of Ahura Mazda, Zarathus'tra's God), Hale notes the following meanings:

In the Ga_tha_s, ahura means 'master' (Y 29.2: based on translation by Stanley Insler, *The Ga_tha_s of Zarathustra*, Acta Iranica, third series, vol. 1, Leiden, E.J. Brill, 1975); ahura also means 'herdsman' (Y.31.10); and in the plural, meaning 'other lords' (truth and good thinking) (Y. 31.4). It is noted that in addition to the mightiest lord, there are other lords such as piety, truth, good

thinking and (good) rule who become a group called Ames’a Spentas in later portions of the Avesta.

Bartholomae takes ahuro_ as’a_ in Y. 51.3 to be vocative dual meaning both Ahura Mazda and As’a (Christian Bartholomae, *Altiranische Worterbuch*, 1904, reprint, Berlin, Walter de Gruyter and Co., 1961, col. 286). Insler interprets the term: ahuro, nominative singular and as’a_ instrumental singular (Insler, *Ga_tha_s*, p. 103).

From the Ga_tha_s, it appears that the words ahura—mazda—was not a proper name of God for Zarathus’tra. Both words were perhaps used as epithets by him: ahura meant ‘lord’ and mazda meant ‘wise’.

Yas’t 10.113 and 10.145 use the term, ‘mitra ahura berezanta’—all vocative dual, and an apparent reference to Mitra and Ahura Mazda. Yt. 10.145 adds that Mitra is in all countries is the head of the country (dainhupaiti). This may be a parallel to the Rigvedic use of the dual: Mitra-Varun.a, thus rendering an interpretation that Ahura Mazda may refer to Varun.a. In Yt. 13.63, ahura is a ruling prince, who is aided by the spirits of the departed righteous (farvas’ayo_).

Yt. 5.85: Whom Ahura Mazda, who does good works, informed: ‘Come, come back down here, O Aredvi_ Su_ra_ Ana_hita_, from those stars to the earth created by Ahura (Mazda). The brave ahuras, the masters of the land, the sons of the lords of the land (dainhu paitinam) will worship you.

Yasna 1.5 refers to Napa_t Apam as an exalted ahura (berezatgo_ ahurahe).. Yasna 1.11 states: “I dedicate…for the sun—possessing fast horses, eye of Ahura Mazda”. This is comparable to the statement in R.gveda (RV 1.50.6) that the sun is the eye of Varun.a.

Hale notes in summary: “…there is one way in which ahuras seem to differ from asuras. Asuras seem to have been selected by the people and installed in their position. Ahuras are often mentioned together with sons of ahuras who also rule. Thus the ahura lordship may have been passed down from father to son in Iran. We have seen no evidence of such a succession in India.” (Hale, opcit., p. 193).

“Any theory that involves an early cult of asuras is unacceptable…On the Iranian side the evidence for a cult of ahuras (in the plural) is very meager…On the Indic side there is also nothing to support this theory. First, the word asura- does not occur as a designation for any specific group of gods—that is, the word itself does not define a certain group of gods. In fact asura- does not even appear in the plural in the Family Books (Man.d.alas 2 to 7) of the R.gveda. Secondly, the usage of asura- is never restricted to gods…Thirdly, there is no being in Vedic literature who is called an asura in the godly sense in the early literature and is later called an asura in the demonic sense. Hence the change that occurs in India is in the usage of the word and not in the nature of a group of beings to which that word applies…In its earliest occurrences in the RV asura- meant something like ‘lord’. Such a lord could be human or divine, but since the RV consists of hymns to gods, it occurs much more often referring to gods. We have seen some of the characteristics of these lords. They normally command some force of fighting men (vi_ra-), should have keen planning ability or insight (kratu-), and in general should have the characteristics that would make one a good leader…in Books One, Eight, and Ten of the RV plural occurrences of asura- first appear and that most of these refer to humans. ..The phrase asura_ adeva_h first occurs in RV 8.96.9. In this phrase asura- is used with exactly the same meaning that it had in its earlist Vedic occurrences. It means ‘lord’. The adjective adeva—here indicates that these asuras were non-Aryan human enemy leaders who did not worship the Aryan gods…In the AV…the asuras there are often enemies…as they do throughout the Bra_hman.as as a group of beings who are enemies of the gods…when a verse in the AV says that Indra fought the asuras, the asuras referred to could easily be indigenous enemy lords…Perhaps the plural usage of asura- for enemies was virtually synonymous with dasyu- and da_sa- and replaced these words in later texts…But by the time of the S’atapatha Bra_hman.a, asuras and ra_ks.ases are practically identical in many passages…Deva- meant god in the Indo-Iranian period. The development of the meaning ‘demon’ for this word in Iran is not connected with the change in meaning of asura- in India.” (Hale, opcit., pp. 179-182). (Wash Edward Hale, *Asura in Early Vedic Religion*, Delhi, Motilal Banarsidass, 1986).

The lexemes related to deva- are instructive, since the meanings include both ‘god’ and ‘devil’. The antithetical semantics seem to have been caused the roots, div- to shine; and dyu (fr. Da_, harm) (cf. a-dyu, not harming (RV 7.34.12: adyum kr.n.ota s’amsam ninitsoh, adi_ptim). The meaning ‘devil’, seems to have evolved since the times of the Cha_ndogya Upanis.ad where the

term, ‘daiva’ is used to denote ‘knowledge of portents (utpa_tajn~a_na)’, perhaps from, dyu = harming or, divya = heavenly, celestial (RV 1.164.) or, diva_ = through heaven (RV 1.161.14: diva_ ya_nti marutah ‘dyuloka_t’, which further expands to connote some unexplainable celestial phenomena as acts of ‘spirits’. The lexeme daivalaka (Ha_ra_vali) refers to a ‘devil worshipper’.Derived from root, div = to shine and diva = sky (MBh.), Pali includes the following meanings for the lexeme de_va: god, demon, rain-god, rain (devo vassati = devo vars.ati). Sindhi deu = devil; Punjabi deu = god, devil; de = demon, idol (de tha_pn.a_ = to set up an image on a wall); Assamese deu = evil spirit; Hindi dew = god, demon; dewa_ = deity; dai_ = godhead, destiny. Similar semantic development is noted in Kannada. Devva, taiya, devvu, daiya (Tbh. of daiva) = a demon, an evil spirit; cf. Telugu dayya, de_ya and Mara_t.hi_ de_va = demon; Tulu devva = evil spirit; daiya ka_n.ike = an offering to demons; daiyan:kad.e = enclosure of an idol; towards god or demon; daiva = deity, demon.. The semantic differentiation is also in the lexemes in Tamil: tev = enemy, enmity, battle; tevvar = enemies; tevvu, tevvin-ai = battle. It is apparently a tradition to make offerings to both gods and demons from very ancient times.

Asura, Soma

In the Vedic age, the devas respected the asuras as their neighbours; indeed, the devas even worshipped the asuras for their superior power; Sarasvat_ was extolled as a_suri_ sarasvati_:

yatha_ deva_ asures.u s’raddha_m ugres.u cakrire (RV 10.151.3)
“Just as the devas rendered faithful worship to the powerful asuras…”

The pura_n.ic and epic age was an era of cultural fusion. “Intermarriages between the two tribes (devas and asuras) continues unchecked. Bhi_ma married Hidimba_, the son, born of their union, Ghat.otkaca fought on behalf of the Pa_n.d.avas in the Kuruks.etra battle. Aniruddha, the grandson of Va_sudeva married Us.a_, the daughter of Ba_n.a_sura. Pururava_’s son A_yu married the daughter of Svarbha_nu, an asura. Not only the inter-tribal marriages was acceptable, even the earlier Brahmanical law-givers went to the extent of including the custom of Asura form of marriage into their law-books and called Asura marriage. In such marriage, the bride was bought from her father by paying bride price (A_s’vala_yana Gr. S. 1.6; Baudha_yana Dharma S. 1.35; Gautama Dharma S. 4.12; Manusmr.ti 3.31). The Vasis.t.ha Dharma

Su_tra (1.35) recognizes such marriage belonging to Manus.a form. Though other sacred texts look on it with disfavour, the Arthas'a_stra (3.2.10) allows it without criticism: pitr.prama_n.a_s' catva_rah pu_rve dharmya_h ma_tr.pitr.prama_n.a_h s'es.a_h. As for instance the marriage of Das'aratha of Ra_ma_yan.a and Pa_n.d.u of Maha_bha_ratta may be taken. Das'aratha of Ayodhya_ married Kaikeyi_and their son was illustrious Bharata. The sister of S'alya namely Ma_dri_ was united with Pa_n.d.u on payment of heavy bride price (MBh. 1.105.4-5)…Pura_n.as…Yaya_ti married S'armis.t.ha_, the daughter of the Asura king Vr.s.aparva_ and had three sons namely Druhyu, Anu and Puru. Because of his affiliation with the mother's side, Puru was called an Asura…matriarchal nature of Asura society…the celebrated Brahminical myth of the churning of the oceasn is a popular ojne, where the Asuras seize the ambrosia, churned out of the ocean before the gods took possession of it…". (Upendranath Dhal, *Mahis.a_sura in Art and Thought*, 1991, Delhi, Eastern Book Linkers, p.27).

As'ur (Akkadian) has, by the nineteenth century BC, been recognized as the national god of Assyria. In political terms, he bestowed the scepter and the crown and blessed the Assyrians. (Tikva Frymerkensky, Ashur, *Encyclopaedia of Religion*, Vol. I, Ed. M. Eliade, pp. 461 ff.) The enmity of Asuras with the gods is noted. (Brown, W.Norman, Proselytizing the Asuras: A noteor R.gveda 10.12, *Journal of the American Oriental Society*, 39, Part 2, 1919, pp. 100-103). Historicity of the Asuras is evaluated and Asuras are described as immigrants from Assyria and were the builders of the Harappan culture. As'ur the deity was symbolized by a winged diSkanda The As'ur people were renowned for magic, medicine, sculpture, architecture and military prowess. (A.Banerji Sastri, The Asuras in Indo-Iranian Literature, *JBROS*, XI.1, March 1926, pp. 110-139; Asura expansion in India, *JBROS*, XII.2, June 1926, pp. 243-285; II Asura expansion by sea, *JBROS*, XII.3, Sept. 1926, pp. 334-360; V Asura Institutions, *JBROS*, XII.4, December 1926, pp. 503-539). The settlements of Assur or Asura in Magadha or South Bihar are noted. (D.R. Bhandarkar, Aryan Immigrants into Eastern India, *ABORI*, XII.2, 1931, pp. 103-116). A comprehensive survey of the texts from the R.gveda and Bra_hman.as is used to analyse the meaning of the term 'asura' as lord, leader and as corroborated by Iranian mythology. It is noted that the terms asura and deva are both used to qualify the same Vedic deity—for example, Indra, Varun.a, Mitra, Agni, while the Iranian works recognize 'asura' as divine and 'daeva' as demoniac. (Wash E. Hale, *Asura in Early Vedic Religion*, Ph.D. Dissertation, Harvard University, 1980; Delhi, Motilal Banarsidass, 1986). An

anthropological perspective identifies the asura as a scheduled tribe of Netarhat plateau of Chotanagpur, Bihar and surveys their customs, rites, economic and social conditions. (K.K.Leuva, The Asur—*A Study of Primitive Iron Smelters*, New Delhi, Bharatiya Adimjati Sevak Sangh, 1963). Asuric culture through the ages is attempted, as a fusion of cultures. (K.P. Chattopadhyaya, *The Ancient Indian Culture Contacts and Migrations*, 1970, Calcutta, Firma KL Mukhopadhyaya). The dominance, in ancient times, of Asuras in extensive areas of Africa and Eurasia is emphasized. (K.L. Jain Vasasiya, *Indian Asuras Colonised Europe*, 1990, Delhi, Itihas Vidya Prakashan). The myths related to the Asura Bali-Va_mana, as a benevolent king and as a devotee of S'iva, is presented. (G.C. Tripathi, Der Ursprung und die Entwicklung der Vaman-Legende in der indischen Literatur, 1968, Wiesbaden, Otto Harrassowitsz). The mythology of Bali is also presented. (Clifford Hospital, *The Righteous Demon—A Study of Bali, 1984*, Vancouver, University of British Columbia). Mahis.a as a leader of Asuras in the context of the mythology of Mahis.a_suramardini is presented. In an evaluation of the genesis of the concept of Asura, it is noted the Ashur Marduk, the supreme deity of Babylonian pantheon was adopted as Ahur Mazda by the Persians after occupying Assyria.. (Upendranath Dhal, *Mahis.a_sura in Art and Thought*, 1991, Delhi, Eastern Book Linkers).

The following Dravidian lexemes are concordant with the semantics of a_rih, [cf. O.Ir. aire = nobleman]. To cite Mayrhofer: "To trace back the name of Aryans in Indo-Germanic time is not plausible, as the word evidently represents only an inner-aryan evolution which is based in a_rih. O.Ir. aire, nobleman is to be kept away according to Thumeysen." (M.Mayrhofer, *Kurzgefasstes etymologisches worterbuch des altindischen*, Heidelberg. 1953-77, Vol. I, p. 52). ar_an_ = sacrificer; ar_aviya virtuous; ar_aviya_n- = virtuous man; ar-avan- one who is virtuous, god, Buddha; ascetic; ar-am = moral or religious duty, virtue, dharma, Yama (Ta.); ar-a, ar-u virtue, charity, alms, law, dharma, Yama (Ka.); ar-am = law, dharma (Ma.)(DEDR 311). Grassman translates a_rya as: 1. good, kind, gracious, friendly which is said of gods, godly beings, of the singer presenting the offerings; 2. true, produce (yield etc.), stranger (from the meaning opposed to godly); 3. stranger (of the songs). (H. Grassmann, Worterbuch zum Rig-veda, Wiesbaden: O. Harrassowitz, 1955, col. 115). Naighan.t.u explains arya as master, lord (Pa_n. iii.i.103). Grassman (ibid., p. 183), connects the root a_r to praise, extol, commend (Geldner: erkennen; cf. RV. VIII.16.6; RV 10.48.3). The Dravidian lexemes cognate with the semantics of a_r: a_r to shout (Ta.); a.r- (a.t-) to call (Ko.);

a_r, a_rcu to cry aloud (Ka.); ara- to moo, make loud hoarse noise (Kod.); a_rbat.a a joyful cry, triumph (Tu.); a_rcu to cry aloud, shout (Te.); a_r to sound (as bell etc.)(Pa.); a_rpa to shout (Kond.a); to call (Kui); a_rh'nai to invite (Kuwi)(DEDR 367).

In RV 1.123.1, arya_ is explained by Sa_yan.a as noble; Geldner interprets the term as kind, favourable.

पृथू रथो दक्षिणाया अयोज्य् ऐनं देवासो अमृतासो अस्थुः ।
कृष्णाद् उद् अस्थाद् अर्या विहायाश् चिकित्सन्ती मानुषाय क्षयाय ॥

1.123.01 The spacious chariot of the graceful (dawn) has been harnessed; the immortal gods have ascended it; the noble and all-pervading Us.a_ has risen up from the darkness, bringing health to human habitations. [daks.in.a_ya_h = of the clever one; she who is skilled in her own function, svavya_pa_ra-kus'ala; bringing health: cikitsanti, healing, remedying the malady of darkness].

Mayrhofer rejects Wust's suggestion aht the term a_rih is comparable with Lat. Ara_re, ploughman. (M.Mayrhofer, *Kurzgefasstes etymologisches worterbuch des altindischen*, Heidelberg. 1953-77, Vol. I, p. 79). The Dravidian lexemes which are consistent with the seamntics of 'plough' are: araka a plough with bullocks etc. complete (Ta.); are a plough (Ma.)(DEDR 198). A possible link with the semantics of a herdsman are seen in lexemes: a.r.yeka.m head cattle-boy (Ko.); a_reku~_d.u a watchman (Te.); a_raike, a_re_kti care of, oprotection (Tu.); a_rayu, arayu to think, search (Te.); a_ra_y to seek (Ta.)(DEDR 377). Mayrhofer, however, while noting the Iranian parallel Av. airya_, OP ariya, a_rya, derives the terms arya (good, true, strange) and a_rya (also, a_ria) from aryah = lord, hospitable lord; master of the house. The terms arya and a_rya occur 68 times in the R.gveda. (H. Grassmann, *Worterbuch zum Rig-veda*, Wiesbaden: O. Harrassowitz, 1955, cols. 115-116 and 185-86).

वित्वक्षणः समृतौ चक्रमासजो ऽसुन्वतो विषुणः सुन्वतो वृधः ।
इन्द्रो विश्वस्य दमिता विभीषणो यथावशं नयति दासम् आर्यः ॥

5.034.06 Thinning (his enemies) in battle, and accelerating the wheels (of his car), he turns away from him who offers no libation, and augments (the

prosperity of) the offerer; Indra, the subduer of all, the formidable, the lord, conducts the Da_sa at his pleasure.
Powerful in fight, stopping the wheel, the opponent of non-pressing one, the strengthener of the pressing one, compeller of everyone, frightening, Indra, the a_rya leads the da_s as he wills. (Geldner)

आ पक्थासो भलानसो भनन्तालिनासो विषाणिनः शिवासः ।

आ यो ऽनयत् सधमा आर्यस्य गव्या तृत्सुभ्यो अजगन् युधा नॄन् ॥

7.018.07 Those who dress the oblation, those who pronounce auspicious words, those who abstain from penance, those who bear horns (in their hands), those who bestow happiness (on the world by sacrifice), glorify that Indra, who recovered the cattle of the Arya from the plunderers, who slew the enemies in battle. [Those who dress: Denominations of the persons assisting at religious rites are: 1. paktha_sah, havis.am pa_cakah, cooks of the butter offered in oblation; 2. bhala_nasah, bhadra va_cinah, speakers of that which is lucky; 3. alina_sah, tapobhir apravr.ddhah, not eminent by austerities; 4. vis.a_n.inah, having black horns in their hands for the purpose of scratching kan.d.uyana_rtham, the same as di_ks.itah, having undergone the preliminary purification called di_ks.a; 5. s'iva_sah, ya_ga_dina_ sarvasya lokasya s'ivakarah, the makers happy of all people by sacrifice and the like].
These people, i.e. Pakthas, Bhala_nasas, Alinas and Vis.a_nins named themselves as his good friends. The feast companion of the A_rya (a_ryah) who led his men in the battle has come to help out of longing fot the cows of Tr.tsu. [Here Indra is the a_rya]. (Geldner).

In Avestan, Yas't, the compound term used is: airya dainha_vo_ (Yas't VIII.9.56) This phrase is translated as the Aryan nations. [J. Darmesteter, The Zend Avesta, Part I, Oxford, *Sacred Books of the East* IV, 1880; In Yas't V.69, there is a legend related to Jama_spa who sees the enemy's army advancing to battle. He pleads with Ana_hita to guide him to victory as also all the other Arians (airya)]. Another phrase used is airyo s'ayana (Yas't X.13) (explained as 'Arian lands or homestead'). In Yas't XIII.87, Ahura Mazda creates 'the race of all Arian regions, the seed of all Aryan lands'.

स हि क्रतुः स मर्यः स साधुर् मित्रो न भूद् अद्भुतस्य रथीः ।

तम् मेधेषु प्रथमं देवयन्तीर् विश उप ब्रुवते दस्मम् आरीः ॥

1.077.03 For he is the performer of rites, he is the destroyer and reviver (of all things), and, like a friend he is the donor of unattained wealth; all men reverencing the gods, and approaching the well-looking Agni, repeat his name first in holy rites. [marya and sa_dhu = destroyer and reviver; or, killer or extirpator of all and the producer]. [vis'a a_ri_h = clans)

He is the insight, he is the young man, he is an excellent creature, he is the wonderful leader (insight?). Him the master, the divinely devoted Arya clans, call first the devoted Arya clans in the sacrifice. (Geldner).

तम् ईळत प्रथमं यज्ञसाधं विश आरीर् आहुतम् ऋञ्जसानम् ।

ऊर्जः पुत्रम् भरतं सृप्रदानुं देवा अग्निं धारयन् द्रविणोदाम् ॥

1.096.03 Approaching him,let all men adore Agni, the chief (of the gods), the accomplisher of sacrifices, who is gratified by oblations and propitiated by praises--the offspring of food, the sustainer of (all men), the giver of continual gifts; the gods retain Agni as the giver of (sacrificial) wealth. [prathama = lit. the first; here, mukhya, chief (of the gods)]. [The term used is: vis'a a_ri_h = of the Aryas, Aryas].

The A_ryan clans (vis'a a_ri_h) called him as the first, sacrificial director, poured in (with butter), the prominent one, the sun of power, the Bharata which has got wide gifts. (Geldner).

य ऋक्षाद् अंहसो मुचद् यो वार्यात् सप्त सिन्धुषु ।

वधर् दासस्य तुविनृम्ण नीनमः ॥

8.024.27 (He it is) who rescues men from the wickedness of evil beings, who enriches (the dwellers) on the seven rivers; now hurl, you who abound in wealth, your weapon at the Da_sa. [Dwelleres on the seven rivers: sapta sindhus.u, i.e. the dwellers on the banks of the seven rivers; or, on the shores of the seven seas].

You who protected us out of the danger from the bear, or you who turned away the weapons from the a_ryas in the seven streamed land of the da_sas, you courageous one. (Geldner).

This hymn attests that the da_sa as well as Indra inhabited the region of the seven rivers (sapta sindhu). This is the airya dainha_vo_ (Yas't VIII.9.56) (the Aryan nations). Avestan dakhyuma, da_khyuuma was the name of a deity of a land. Cognate lexemes are: dasma, dasra denoting accomplishment of wonderful deeds. (Ch.Bartholomae, *Altiranisches Worterbuch*, Berlin, 1925 (?), Col. 706-711; derived from dan:h; cf. Kanga, *An Avesta-English-Gujarati Dictionary*, Bombay).

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8.024.27 (He it is) who rescues men from the wickedness of evil beings, who enriches (the dwellers) on the seven rivers; now hurl, you who abound in wealth, your weapon at the Da_sa. [Dwelleres on the seven rivers: sapta sindhus.u, i.e. the dwellers on the banks of the seven rivers; or, on the shores of the seven seas].

The term dasyu is used in RV. 6.18.3, 7.5.6, 2.11.18, 1.51.8 with the possible connotation of 'people in general or inhabitants who are associated together in a place'. Some of the epithets associated with dasyu are: abrahman (RV 4.16.9, without prayer), avrata (RV 1.51.8; 175.3; 6.14.3; 9.41.2, without vows), anyavrata (RV. 8.70.11, with different vows), apavrata (RV 5.42.9, with bad vows), ayajvan (RV 8.70.11, not sacrificing); ayajyu (RV 7.6.3, not sacrificing).

त्वे असुर्यं वसवो न्यृ ऋण्वन् क्रतुं हि ते मित्रमहो जुषन्त ।
त्वं दस्यूँरोकसो अग्न आज उरु ज्योतिर् जनयन्न् आर्याय ॥

7.005.06 Reverencer of friends, Agni, th Vasus have concentrated vigour in you; they have been propitiated by your acts; generating vast splendour for the Arya, do you, Agni, expel the Dasyus from the dwelling.

त्वं ह नु त्यद् अदमायो दस्यूएकः कृष्टीर् अवनोर् आर्याय ।

अस्ति स्विन् नु वीर्यं तत् त इन्द्र न स्विद् अस्ति तद् ऋतुथा वि वोचः ॥

6.018.03 You are he who has quickly humbled the Dasyus; you are the chief one who has given posterity to the Arya;but, Indra, is not verily your power such? If it be not, then in due season confess. [Not beholding Indra, the r.s.i began to question his attributes and power; next verse explains his belief in these attributes and power].

धिष्वा शवः शूर येन वृत्रम् अवाभिनद् दानुम् और्णवाभम् ।

अपावृणोर् ज्योतिर् आर्याय नि सव्यतः सादि दस्युर् इन्द्र ॥

2.011.18 Indra, hero, keep up the strength wherewith you have crushed Vr.tra, the spider-like son of Da_nu, and let open the light to the A_rya; the Dasyu has been set aside on your left hand. [The spider-like son of Da_nu: da_num aurn.ava_bham: aurn.ava_bham = aurn.ana_bham; aurn.a = a spider; a_bha = resembling].

वि जानीह्य् आर्यान् ये च दस्यवो बर्हिष्मते रन्धया शासद् अव्रतान् ।

शाकी भव यजमानस्य चोदिता विश्वेत् ता ते सधमादेषु चाकन ॥

1.051.08 Discriminate between the A_ryas and they who are Dasyus; restraining those who perform no religious rites, compel them to submit to the performer of sacrifices; be you, who are powerful, the encourager of the sacrificer; I am desirous of celebrating all your deeds in ceremonies that give you satisfaction. [A_ryas are those who practise religious rites;Dasyus do not observe religious ceremonies and inimical to those who do].

Atharvan

> **atharva_n.am pitaram devabandhum ma_turgarbha piturasum yuva_nam**
> **ya imam yajn~am manasa_ ciketa pra n.om vocastamiheha bravah**

AV 7.1 Father Atharvan, god-relative, mother's foetus, father's spirit (asu), young, who understands (cit) with the mind this sacrifice—him mayest thou proclaim to us here, here mayest thou speak.

Mystic: on the offering or sacrifice

yajn~ena yajn~amayajanta deva_sta_ni dharma_n.i prathama_nya_san
te ha na_kam mahima_nah sacanta yatra pu_rve sa_dhya_h santi deva_h

AV 7.5.1 By the sacrifice the gods sacrificed to the sacrifice; those were the first ordinances (dharman); those greatnesses attach themselves to (sac) the firmament, where are the ancient (pu_rva) perfectible (sa_dhya_) gods.

Indra's accomplishment is the 'release of the SHINING waters'.

वधीं वृत्रम् मरुत इन्द्रियेण स्वेन भामेन तविषो बभूवान् ।

अहम् एता मनवे विश्वश्चन्द्राः सुगा अपश् चकर वज्रबाहुः ॥

1.165.08 (Indra): By my own prowess, Maruts, I , mighty in my wrath, slew Vr.tra; armed with my thunderbolt, I created all these pellucid gently-flowing waters for (the good of) man.

I killed Vr.tra, O you Maruts, with Indra's power which grew strong by my own fury. I have made flowing these shining waters for Manu with the bolt in my hand. (Geldner).

त्वा युजा तव तत् सोम सख्य इन्द्रो अपो मनवे सस्रुतस् कः ।

अहन्न् अहिम् अरिणात् सप्त सिन्धून् अपावृणोद् अपिहितेव खानि ॥

4.028.01 Through that friendship, Soma, which has united you with your (friend) Indra, he has made the waters flow for man; he has slain Ahi; he has sent forth the seven rivers, and has opened the shut-up sources (of the streams).

With you in alliance, in your companionship, O Soma, at that time you made, Indra, flow together the waters for Manu. He killed Vr.tra (Ahi) let the seven

streams run, and opened the channels (kha_ni_) which were as if closed or barred. (Geldner).

सप्तापो देवीः सुरणा अमृक्ता याभिः सिन्धुम् अतर इन्द्र पूर्भित् ।

नवतिं स्रोत्या नव च स्रवन्तीर् देवेभ्यो गातुम् मनुषे च विन्दः ॥

10.104.08 The seven divine meandering rivers with which you, Indra, the destroyer of cities, replenished the ocean, flow unimpeded; you did discover the nine-and-ninety flowing rivers (and their) path for gods and men.
Seven are the divine waters, the gladdening ones, the undiminished, with which you, Indra the fort-breaker crossed the Sindhu, the nine and ninety flowing streams. You found the way for gods and Manu. (Geldner).

Indra fights against both da_sa and a_rya clans. The only determining factorsin Indra's choice of foes to battle with are the 'release of the waters' and the purification of soma. The intra- and inter-clan conflicts are merely irrelevant.

उत त्या सद्य आर्या सरयोर् इन्द्र पारतः ।

अर्णाचित्ररथावधीः ॥

4.030.18 You have slain at once those two A_ryas, Arn.a and Citraratha, (dwellig) on the opposite (bank) of the Sarayu. [Those two A_ryas:a_rya_ = a_rya_bhima_nau, a_ryatvabhima_ninau, presuming on their dignity as a_ryas, and being without any faith or devotion].
All those two a_ryas Arn.a and Chitraratha you, O Indra, have vanquished on the otgher side of Sarayu. (Geldner).

हतो वृत्राण्य् आर्या हतो दासानि सत्पती ।

हतो विश्वा अप द्विषः ॥

6.060.06 Counteract all oppressions (committed) by the pious; counteract all oppressions (committed) by the impious; protectors of the virtuous, destroy all those who hate us. [hato vr.tra_n.i a_rya_ hasto da_sa_ni: vr.tra_n.i and da_sa_ni are neuter and may not signify a_ryas and da_sas themselves; so, the interpretation is: a_ryaih and da_saih kr.ta_ni, things done by them severally, that is, upadravaja_ta_ni, things generated by violence or oppression and the like. This is a remarkable equivalence between a_ryas and da_sas].

They strike the a_ryan enemies, they strike the da_sic enemies as the lawful lords. They hit or strike down all the enmities. (Geldner).

वि जानीह्य् आर्यान् ये च दस्यवो बर्हिष्मते रन्धया शासद् अव्रतान् ।

शाकी भव यजमानस्य चोदिता विश्वेत् ता ते सधमादेषु चाकन ॥

1.051.08 Discriminate between the A_ryas and they who are Dasyus; restraining those who perform no religious rites, compel them to submit to the performer of sacrifices; be you, who are powerful, the encourager of the sacrificer; I am desirous of celebrating all your deeds in ceremonies that give you satisfaction. [A_ryas are those who practise religious rites;asyus do not observe religious ceremonies and inimical to those who do].

Distinguish between the a_rya and the dasyus, disciplining the undominated make them subject to the sacrificer. Make yourself strong, (be) encourager of the sacrificer. In all this activity for you, I have my pleasure among the soma-banquets. (Geldner).

त्वं ताइन्द्रोभयाअमित्रान् दासा वृत्राण्य् आर्या च शूर ।

वधीर् वनेव सुधितेभिर् अत्कैर् आ पृत्सु दर्षि नृणां नृतम ॥

6.033.03 You, hero, Indra, destroyed both (classes of) enemies, (both) Da_sa and A_rya, adversaries; chief leader of leaders, you cut your foes in pieces in battles with well-plied weapons, as (wood-cutters fell) the forests.

Strike down, O brave Indra, these two opponents, i.e. the da_sic and the a_ryan enemies just like the trees, in suitable clothes! Burst (them) in the battles, O you, the bravest of the men. (Geldner).

सनेम ये त ऊतिभिस् तरन्तो विश्वा स्पृध आर्येण दस्यून् ।

अस्मभ्यं तत् त्वाष्ट्रं विश्वरूपम् अरन्धयः साख्यस्य त्रिताय ॥

2.011.19 Let us honour those men, who, through your protection, surpass all their rivals, as the Dasyus (are surpassed) by the Arya; this (have you wrought) for us; you have slain Vis'varu_pa, the son of Tvas.t.a_, through friendship of Trita. [Trita: in this and next hymn, he is referred to as a mahars.i].

We who might gain the advantage, while we with your help win all the opponents, the dasyus with the a_ryas, to us you gave at that time Tvas.t.r.'s son Vis'varu_pa in the hand, (the son) of (Tvas.t.r.) belonging to friendship and to Trita. (Geldner).

आ सं॒यत॑म् इन्द्र णः स्व॒स्तिं श॑त्रुतूर्या॑य बृह॒तीम् अमृ॑ध्राम् ।

यया॒ दासा॒न्य् आर्या॑णि वृत्रा करो॑ वज्रिन् सु॒तुका॒ नाहु॑षाणि ॥

6.022.10 Bring to us, Indra, concentrated, vast and unassailable prosperity beyond the reach of enemies, and by which, wielder of the thunderbolt, you have rendered human enemies, whether Da_sas or A_ryas, easy to be overcome.

O Indra, (bring) us steady luck for the conquest of enemies, great, not to be neglected by means of which you put to fight at full speed the da_sic, the a_ryan enemies, the nahus.ians, you vajra-bearer (Geldner).

यु॒वां न॑रा॒ पश्य॑मानास॒ आप्य॑म् प्रा॒चा ग॒व्यन्तः॑ पृथु॒पर्श॑वो ययुः ।

दासा॑ च वृत्रा ह॒तम् आर्या॑णि च सु॒दास॑म् इन्द्रावरु॒णाव॑सावतम् ॥

7.083.01 Indra and Varun.a, leaders (of rites), contemplating your affinity, and desirous of cattle, the worshippers, armed with large sickles, have proceeded to the east (to cut the sacred grass); destroy, Indra and Varun.a, your enemies, whether Da_sa_s or A_rya_s and defend Suda_sa with yor protection. [Sickles: pr.thupars'avah = visti_rn.a s'vapars'u hasta, holding large rib-bones of horses; as'vapars'u = an implement for cutting the kus'a grass (as'vapars'va_ barhiracchaiti: Taittiri_ya Bra_hman.a 3.2.2.1), either the rib of a horse, or an instrument like it; it is frequently alluded to in the Bra_hman.as and Su_tras; Taittiri_ya Sam.hita_ 1.1.2: ghos.ad asi: Baudha_yana says that this is addressed to the As'vapars'u; you are the implement, the priest having taken it in his hand; as'vapars'u as'vapars'vasthi, the rib-bone of a horse, the edge of which is as sharp as a sword, and fit for cutting; tac ca khad.gavat ti_ks.n.adbaratvat lavane samarthah].

Hit the da_sic and a_ryan enemies and stand helpful to suda_sa, You Indra and Varun.a (Geldner).

यस्या॒यं विश्व॒ आर्यो॒ दासः॑ शेवधि॒पा अ॒रिः ।

ति॒रश् चि॑द् अ॒र्ये रुश॑मे॒ परी॑रवि॒ तुभ्येत् सो अ॑ज्यते र॒यिः ॥

8.051.09 That wealth, which every A_rya here covets and every miserly Da_sa, is sent direct to yo, the pious Rus'ama Paviru.

To whom every well known a_rya and da_sa who protects his treasure is an enemy, for you only this treasure has been kept for show with the noble rus'ama paviru, over (the other) high lords. (Geldner).

अयम् एमि विचाकशद् विचिन्वन् दासम् आर्यम् ।

पिबामि पाकसुत्वनो ऽभि धीरम् अचाकशं विश्वस्माद् इन्द्र उत्तरः ॥

10.086.19 [Indra speaks]: Here I come to the (sacrifice) looking upon (the worshippers), distinguishing the Da_sa and the A_rya; I drink (the Soma) of the (worshipper), who effuses (the Soma) with mature (mind); I look upon the intelligent (sacrificer); Indra is above all (the world). [cf. Muir, Sanskrit Texts, vol. 2, p. 374].

Indra says: I wander about holding a survey and differentiating between the da_sa and a_rya. No I drink with him who ferments a smooth (draught). I have looked out for an expert. Higher than everything stands Indra. (Geldner).

यस् ते मन्यो ऽविधद् वज्र सायक सह ओजः पुष्यति विश्वम् आनुषक् ।

साह्याम दासम् आर्यं त्वया युजा सहस्कृतेन सहसा सहस्वता ॥

10.083.01 He who worships you, Manyu, the thunderbolt, the destroyer (of enemies), enjoys all might and strength, combined; may we oversome the Da_sa and the A_rya with you for our ally, invigorating, strong and vigorous. [Deity Manyu: Manyu is the personification of, or the deity presiding over, anger; the su_kta is to be repeated at sacrifices for the destruction of enemies. Vigorous: sahasa_ = through your vigorous vigour].

Who has made you right, O Manyu, you (Indra's) thunderbolt, your arrow which develops completely its entire strength and power. We wish to compel the da_sa and the a_rya with you in alliance, with the might-born, and the mightful might. (Geldner).

आ संयतम् इन्द्र णः स्वस्तिं शत्रुतूर्याय बृहतीम् अमृध्राम् ।

यया दासान्य् आर्याणि वृत्रा करो वज्रिन् सुतुका नाहुषाणि ॥

6.022.10 Brin to us, Indra, concentrated, vast and unassailable prosperity beyond the reach of enemies, and by which, wielder of the thunderbolt, you have rendered human enemies, whether Da_sas or A_ryas, easy to be overcome.

त्वं ताइन्द्रोभयाअमित्रान् दासा वृत्राण्य् आर्या च शूर ।
वधीर् वनेव सुधितेभिर् अत्कैर् आ पृत्सु दर्षि नृणां नृतम ॥

6.033.03 You, hero, Indra, destroyed both (classes of) enemies, (both) Da_sa and A_rya, adversaries; chief leader of leaders, you cut your foes in pieces in battles with well-plied weapons, as (wood-cutters fell) the forests.

The terms used in R.gveda are: deva_v asura_ and asura_ adeva_h. The terms may be interpreted as: (dual) devas and asuras; asuras without devas.
Pa_n.ini lists asura in warrior clans; explaining under the pars'va_di gan.a rule: whenver the form asura is used (a prince) belonging to the asura warrior clan may be implied. This is an apparent continuation of the asura as a class of beings right from the days of the R.gveda. (Pa_n.ini, As.t.a_dhya_yi, 5.3.117).

Sarasvati_ is referred to as the daughter of Asuras in AV 6.100.3. In RV. 1.35.7 asura is interpreted as lord, powerful, divine spirit (gabhi_ravepa asurah). It is the soma being purchased, asurah kri_yama_n.ah (TS 4.4.9.1); asuratva is divine dignity (RV. 3.55.1; mahad deva_na_masuratvamekam asyati ks.ipyati sarva_nityasurah prabalah tasya bha_vosuratvam pra_balyam). Asura brahma is a reference to the priest of the Asuras (KS. 30.1: tri.s.t.a_varu_tri_ a_sta_masurabrahmau). Asu_ryam is divine dominion or divine sovereignty (RV 2.35.2, asurah s'atru_n ks.epta_ tasya svabhu_tasya balasya).

H. Skold argued that asura could not have been derived from as's'ur. If the derivation were true, the s' in as's'ur should appear in Sanskrit as s' and in Avestan as s, not as the s and h we have in asura- and ahura-.(Hannes Skold, Were the Asuras Assyrians? *The Journal of the Royal Asiatic Societry of Great Britain and Ireland*, April 1924, pp. 265-7). Von Bradke suggested that asura-could derive from as, 'to be', or ans, 'to support', perhaps the latter. (P.von Bradke, Beitrage zur altindischen Religions – und Sprach-geschichte, *Zeitschrift der Deutschen Morgenlandischen Gesellschaft*, 40, 1886, 347-8). Polome connects as's'ura with Hittite has's'us, which means king. (E.Polome, L'etymologie due terme germanique *ansuz 'dieu soverain', *Etude Germanique*, 8, 1953, 41). Schlerath analyzes asura as as-ura and derives Avestan ahu- and ahura-, Indic asura-, Hittite has's'u and Latin erus from reconstructed root *axs- meaning 'beget'. (Bernfried Schlerath, Altindisch asu-, Awestisch ahu- und a_hnlich klingende Worter, in: *Pratida_nam: Indian*,

Iranian and Indo-European Studies presented to Franciscus Bernardus Jacobus Kuiper on his Sixtieth Birthday, ed., by J.C. Heesterman, G.H. Schoker, and V.I. Subramoniam, The Hague, Mouton, 1968, p. 146). Hale proposes an alternative to Schlerath's etymology by suggesting an Indo-European *Hesu- from which came Avestan ahu- 'lord' and Hittite has's'u 'king' and an Indo-Iranian derivative of this word, *asura- from which Avestan ahura- and Vedic asura- derive.. (Wash Edward Hale, opcit., p. 36). Hale's argument is not convincing; if *Hesu- could have yielded Hittite has's'u, Vedic asura- could also have yielded the Hittite has's'u and Assyrian as's'ura. Such a straight-forward Vedic-Avestan route may also explain the presence of Sanskrit lexemes in Kikkuli's horse training manual, Indic names among the names of Mitanni kings and Vedic deities named in the Mitanni treaty. A validation of this hypothesis can be made by tracing the so-called Dravidian and Mun.d.a lexemes in R.gveda and identifying concordant Avestan glosses.

Three Sarasvati_s and asuras

> **deva_ aduh su_ryo ada_d dyaurada_t pr.thirvya_da_t**
> **tisrah sarasvati_raduh sacitta_ vis.adu_s.an.am**
> **yad vo deva_ upaji_ka_ a_sin~can dhanvanyudakam**
> **tena devaprasu_tenedam du_s.ayata_vis.am**
> **asura_n.a_m duhita_si sa_ deva_na_masi svasa_**
> **divaspr.thivya_h sambhu_ta_ sa_ cakartha_rasam vis.am**

AV 6.100.1-3 (Against poison: Garutman--va_naspatyam). The gods have given, the sun has given, the sky has given, the earth has given, the three Sarasvati_s have given, accordant, the poison-spoiler.
The water which the gods poured for you, O upaji_kas, on the waste, with that, which is impelled by the gods, spoil ye this poison.
Thou art daughter of the Asuras; thou, the same, art sister of the gods; arisen from the sky, from the earth, thou hast made the poison sapless.

Id.a_, Sarasvati_, and Bha_rati_ and are referred to as tisro devi_h (AV 5.12.8). The reference to tisrah sarasvati_h (the three sarasvati_s) in AV 6.100.1 is explained by Sa_yan.a: tisrah trisan:khya_ka_h sarasvati_h sarasvatyas trayi_ru_pa_h yadva_ id.a_ sarasvati_ bha_rati_ti tisro devyah sa_hacarya_t sarasvatya ucyante (Sa_yan.a, *Atharvaveda Bha_s.ya*, Part II, ed. Vis'va Bandhu, Hoshiarpura, 1961, p. 797). Another interpretation is that the reference is to three rivers names Sarasvati_ or just three rivers in general. The

number three may be in consonance with the reference to three heavens and three earths. S'ri_pa_da Da_modara Sa_tvalekara, *Atharvaveda Subodha Bha_s.ya*, Parts I to IV, 1958 and Part V, 1960, Sva_dhya_ya Man.d.ala, Pa_rad.i_, Su_rata comments that the three sarasvati_s are goddesses of learning: ma_tr.bhu_mi, ma_tr.bha_s.a_ and ma_tr.sabhyata_: Bha_rati_ is ma_tr.bhu_mi who feeds, Id.a_ is ma_tr.bha_s.a_ who inspires people to perform sacrifice and Sarasvati_ is ma_tr.sabhyata_ who inspires people to perform good deeds.

बृहद् उ गायिषे वचोऽसुर्या नदीनाम् ।
सरस्वतीम् इन् महया सुवृक्तिभि स्तोमैर् वसिष्ठ रोदसी ॥

7.096.01 You chant, Vasis.t.ha a powerful hymn to her who is the most mighty of rivers; worship, Vasis.t.ha with well-selected praises, Sarasvati_, who is both in heaven and earth. [Who is both in heaven and earth: as a goddess, or as eloquence or as river].
"I wish to sing a high word: (she is) the asuric one among rivers. Magnify indeed Sarasvati_ with songs, with praises, O Vasis.t.ha, and the world-haves." Tr. Hale, W.E., *Asura in Early Vedic Religion*, p. 63; this interpretation seems to imply that Sarasvati_ is the lordly one among rivers and is associated with asuras.

It will be erroneous to assume that the term, 'asura' connotes a demoniacal, opposing power in the Rigvedic times. The early connotation is simply to the sacrifice or ya_ga, performed using agni. Ahura Mazda is the 'Wise Lord', the chief Zoroastrian god who created the cosmos like an artisan. The Cosmic Order is one aspect of truth; good fighting and succeeding against the evil of chaos. The name, ahura mazda is derived from Vedic Sanskrit: asura medhas. Medhas means wisdom or mental power (su-medhas); medha means sacrifice (ya_ga) or sacrificial post (RV 3.58.2; medha = lance shaft, medha_ vana_ na kr.n.avanta u_rdhva_ yajn`a_n: RV 1.88.3); it also refers to essence, meat-juice, oblation: yajn~iyasa_ra, ma_m.sarasa, havyah.; (megham jus.anta vahnayah havih (RV 1.162.10); medhapati is lord of sacrifice, lord of animal sacrifice (RV 1.43.4, medhapati rudram); medhayu = longing for sacrificial meal (RV 4.38.3); medha-sa_ti = receiving the oblation (RV 1.129.1, yajn~sya la_bha_ya); medha_ = wisdom, insight (RV 1.165.14); medha_ka_ra = bestowing wisdom (RV 10.91.8); medha_tithi is the name of a r.s.i, a guest at a

sacrificial feast (RV 1.36.10; RV 8.8.20, ya_bhih kan.vam medha_tithim); medhya = deserving oblation, entitled to the fruit of a sacrifice (RV 5.1.12). With these examples of semantic expansion related to the term, ‘medhas’, it is apparent that the phrase Ahura Mazda refers to Asura Medha or Asura Ya_ga, in a personification of the yajn~a. Considering that in Taittiri_ya Sam.hita_, asura is specifically referred to as the purchased soma, the yasna elaborated in Avesta is related to the processing of haoma (Soma). The rituals adored in the Avestan tradition are an elaborate re-enactment of the processing of soma described in the R.gveda. Apparently, by the days of the Avestan, the Soma processing had become a ritualistic imitation using plant products to represent Soma; while, in the Rigvedic days, the processing of Soma related to the processing of mineral ores, such as electrum or gold-silver quartz.

K.R.V. Raja suggested in 1908 that the Indo-Aryans borrowed asura- from the Assyrians. (K.R.V.Raja, Asura Maya, *Journal of the Royal Asiatic Society of Great Britain and Ireland*, January 1917, pp. 131-2). R.G. Bhandarkar noted that the people who entered into a treaty in Asia Minor and named five Vedic deities of the Mitanni were the pre-Vedic people who were in contact with the Assyrians. (R.G. Bhandarkar, The Aryans in the Land of the Asuras, *The Journal of the Bombay Branch of the Royal Asiatic Society*, 25, 1918, 76). A. Banerji-Sastri expounded in detail, the theory that asura- derived from the Assyrians. He cites the Bhavis.ya Pura_n.a which states that the asuras came from across the sea of salt water.(A.Banerji-Sastri, *Asura India*, Patna, 1926; The Asuras in Indo-Iranian Literature, *The Journal of the Bihar and Orissa Research Society*, 12, 1926, 110-1; Asura Expansion by Sea, *The Journal of the Bihar and Orissa Research Society*, 12, 1926, 336).

Alfred Hillebrandt argues that the degradation of the term asura- (from its basic meaning ‘lord’ to the meaning of ‘evil spirit’) occurred because of the encounters between Indians and Iranians after their separation, but fore Zarathus’tra’s reform. He adds that the phrase he ‘lavo attributed to the asuras in the S’atapatha Bra_hman.a indicates that Indian enemies from the east are also included among asuras, since this phrase would be a Prakrit form from that area. (Alfred Hillebrandt, *Vedische Mythologie*, 3 vols., Breslau, Verlag von M. and H. Marcus, 1902, vol 2., p. 440). The following Indic etyma may explain the use of the term he ‘layo: halla_ = tumult, noise (P.Ku.N.B.Or.H.); halphal = shaking, undulation (A.)(CDIAL 14017). Hallana = tossing about (Skt.); hallai – moves (Pkt.); alun = to shake (K.) ale, alaku = to shake (Ka.)(CDIAL 14003; 14918). Hillo_la = wave (Skt.); hillo_layati = swings,

rocks (Dha_tup.); hilorna_ = to swing, rock to and fro (H.); hilolai = shakes (OMarw.)(CDIAL 14121). Hillo = a jerk, a shake; a push; a shock; hello = a jolting of a carriage (G.) helao = to move, drive in (Santali). The semantics, ‘rocking to and fro’ and ‘wave’ point to sailing on high seas. This is authenticated by a Tamil lexeme: e_le_lo = a word that occurs again and again in songs sung by boatmen or others while pulling or lifting together; e_le_lan- = name of a Chola king; e_lappa_t.t.u = boatmen’s song in which the words e_lo_, e_le_lo occur again and again (Ta.lex.) This leads to a possible interpretation of some of the mlecchas, who shout, ‘he ‘lavo, he ‘lavo’, as ‘sea-farers’ and is consistent with the evidence of economic texts from Mesopotamia which point to extensive trade relations with ‘meluhha’, which is generally equated with the Indic civilization area.

S.C.Roy notes that Mun.d.as have a tradition that India was previously occupied by a metal-using people called Asuras. One tribe of the Mun.d.a group are called Asuras today. (Rai Bahadur S.C. Roy, The Asuras—ancient and modern, *The Journal of the Bihar and Orissa Research Society*, 12, 1926, 147). This analysis is consistent with the characterization of asura- with creative activity. Considering the sea-faring merchants of Indic civilization had traded in metals and ores over an extensive area and the evolution of the bronze-age, ca. 3500 B.C. in the region with the invention of alloying copper with tin to yield bronze and manufacture of hardened metallic weapons and tools, the dominant ‘lordship’ of the civilization would have rested with the people with asuric or creative capabilities, who were later identified as a group of people called ‘asuras’.

R.gveda dasa > Avestan daha

In the Avestan tradition, 99 was the first king and the saviour of mankind. This status is given to Manu in R.gveda; Manu is our father Manu (RV 2.33.13); people are manuja_tam, born from Manu (RV 1.45.1).

नू म॒ आ वाच॒म् उप॑ याहि वि॒द्वान् विश्वे॑भिः सूनो सहसो॒ यज॑त्रैः ।
ये अ॑ग्निजि॒ह्वा ऋ॑त॒साप॑ आ॒सुर् ये मनुं॑ च॒क्रुर् उप॑रं॒ दसा॑य ॥

6.021.11 Come quickly, son of strength, you who know (all things), upon my prayer; together with all the adorable (divinities); they who, with the tongue of

Agni, are partakers of the sacrifice, who rendered Manu (victorious) over his adversaries. [Ye manum cakrur uparam dusa_ya s'atru_n.a_m or dasyu_na_m uparibhavam = who made Manu the ra_jars.i, manum ra_jars.im, over or the overcomer of enemies, or the Dasyus].

[Sa_yan.a explains ‘dasa’ as s’atrun.a_m upaks.apan.a_ya, for dwelling near the enemies. (*Rgveda Samhita_*, Vaidika Samshodhana Mandala, 1933, Vol. III, p.87). An alternative interpretation makes Manu the follower of Dasa:] Now come here on my call understandingly, O you son of strength, with all worthy of sacrifice (i.e. gods), who have agni as their tongue and who cultivate ttruth, who made Manu the follower of Dasa. (Geldner, who also adds a footnote: “Dasa is the mythical clan-father of the da_sas or dasyus.”).

S’atapatha Bra_hman.a (Julius Eggeling, S’atapatha Bra_hman.a, Tr. Into English, Oxford, *SBE*, Vol. XII, 1882, pp. 216-18) notes: 4. (The fish) soon became jhas.a (a large fish); for that grows largest (of all fish). Thereupon it said: ‘In such and such a year that flood will come. Thou shalt then attend to me (i.e. to my advice) by preparing a ship; and when the flood has risen thou shall enter into the ship, and I will save thee from it. In Skt. Da_sa is a sailor, mariner. In Avestan dasa means an object of moving (travellinjg, i.e. changing) possession. (Ch. Bartholomae, *Altiranisches Worterbuch*, col. 701). This may explain why Geldner calls Manu a follower of Dasa while interpreting the Rigvedic hymn.

Daha = a tribe of jats (L.); da_s’a fisherman, ferryman (VS)(CDIAL 6314). Da_sa = knowing man (Skt.); da_ho = wise (S.); da_hi, da_hapa wisdom (S.); da_h news, information (L.); da_hi_ informer (L.); da_hyu_ wise (G.)< da_ks.ya skill (MBh.); da_ho skillfully (H.)(CDIAL 6317; 6152).

“…I would quote the Veda word dasa- occurring only in R.gveda 6.21.11 ye manum cakrur uparam dasa_ya ‘(the devas) who made Manu – successor to Dasa-‘ The Iranian daha- which corresponds in form to Indian dasa- is found in its basic meaning in Khotan Saka daha- ‘man’ as contrasted with ‘woman’, and adjective dahu_na—‘manly, bold’. As an ethnic name the Old Persian inscription has daha_ ‘the Dahian people’ with the adjective Avestan da_ha-. The name was known in Arab and Persian histories in the region called Dihista_n ‘the land of the Daha people’. The Old Indian words da_sa-, da_sa_- and dasyu- were used of enemies. But the modern Romani das means simply ‘man’. The commentators thought of enmity also in relation to dasa-. Other

details concerning daha- are given in the article ‘Iranian arya- and daha-‘ in the Transactions of the Philological Society 1959, 107-115.” (H.W.Bailey, Veda and Iranian, in:*Golden Jubilee Volume*, ed. T.N.Dharmadhikari, Poona, Vaidika Sams;odhana Man.d.ala, 1981, p.7). This is consistent with an interpretation that dasyu- meant, ‘people of a region, in general’ (see below).

Some good asuras are a_dityas and are led by Varun.a. Martin Haug had proposed a theory that developments of asura in India and ahura in Iran arose from a split in the religion of a erstwhile combined group of people. (Arthur Berriedale Keith, *The Religion and Philosophy of the Veda and Upanishads*, 2 vols., Harvarfd Oriental Series, Vols. 31 and 32, 1925, reprint, Delhi, Motilal Banarsidass, 1970, vol. 1, p. 231). P. von Bradke (*Dya_us Asura, Ahura Mazda_ und die Asuras*, Hale, Max Niemeyer, 1885) notes the derivative used as adjective, asurya may be explained as ‘highest lordship’ or ‘highest lordship of the gods’. Thus, he deduces that asura mean an epithet of the highest god. The translation of asura as ‘hochste gottesherrlichkeit’ may not be approproate; it may, however, mean ‘highest lordship of the gods’ only in a few contexts. Sten Konow notes the borrowing of the word asura into Finno-Ugric as ezoro—with the meaning ‘lord’ and hence concludes that the early meaning of asura may be ‘lord’ and related to Latin erus. (Sten Konow, Zur Frage nach den Asuras, in: *Beitra_ge zur Literatur-wissenschaft and Geistesgeschichte Indiens, Festgabe Hermann Jacobi zum 75, Geburtstag*, ed. By Willibald Kirfel, Bonn, Kommissionsverlag Fritz Klopp, 1926, p.76). Amarakos’a lists pu_rvadeva (an older class of gods) as a synonym for asura. (U.Venkatakrishna Rao, The Romance of Words, *The Aryan Path*, 14, 1943, p. 205).

Haug makes an incisive observation: “That the Asuras of the Brahmanical literature are the supreme beings of the Parsis (Ahuramazda with his arch-angels) is, according to these statements, hardly to be doubted. But there exists, perhaps, a still more convincing proof. Among the metres, used in the Yajurveda, we find seven which are marked by the epithet a_suri, such as Ga_yatri a_suri, Us.nih a_suri_, pan:kti a_suri_. These Asura metres, which are foreign to the whole R.gveda, are actually to be found in the Ga_tha literature of the Zend-Avesta, which professedly exhibits the doctrines of the Ahura (Asura) religion. The Ga_yatri_ A_suri_ consists of fifteen syllables, which metre we discover in the Ga_tha Ahunavaiti, if we bear in mind that the number of sixteen syllables, of which it generally consists, is often reduced to fifteen (compare, forinstance, Yas. 31.6 and the first two lines of 31.4). The Us.n.ih a_suri_, consisting of fourteen syllables, is completely extant in the

Ga_tha Vohu-khshathra (Yas. LI), each verse of which comprises fourteen syllables. The Pan:kti a_suri_ consists of eleven syllables, just as many as we found in the Ga_thas Ushtavaiti and Spenta_ mainyu_. This coincidence can certainly not be merely accidental, but shows clearly, that the old Ga_tha literature of the Zend-Avesta was well known to the Rishis who compiled the Yajurveda...Indra... is expressly mentioned in the list of the Devas or demons which we find in Vend. 19.43. He is there, second only to Angro-mainyush (Ahriman), the arch-fiend who is sometimes designated daevana_m daevo, 'demon of demons' in the Avesta, but 'god of gods' in Sanskrit. Next to Indra stands Saurva daeva, whom we discover in one of Shiva's names Sharva (see the White Yajurveda, 16.28). In Naonhaithya daeva we readily recognize the Na_satyas of the Vedic hymns, which name is there given to the two Ashvins, the Dioskuri of the Indian mythology...Some names of the Vedic Devas are, however, used in a good sense, and are transformed into Yazatas or angels in the Zend-Avesta. The most noticeable is Mithra, the Sanskrit form being Mitra. In the Vedic hymns he is generally invoked together with Varun.a (identical with the god Uranas of the Greeks), the ruler of heaven and master of the universe; but in the Zend-Avesta he was everywhere separateds from hbis ancient companion...Another Vedic deity Aryaman, who is generally associated with Mitra and Varun.a (RV 1.136.2), is at once recognized in the angel Airyaman of the Zend-Avesta. Aryaman has in both scriptures a double meaning, (a) a friend, associate (in the Ga_thas it chiefly means 'a client'); (b) the name of a deity or spirit who seems particularly to preside over marriages, on which occasions he is invoked both by Brahmans and Parsis. He seems to be either another name of the sun,...or his constant azssociate and representative...Nara_s'ansa (see Ya_ska's Nirukta 8.6), an epithet of several Vedic gods, such as Agni, Pu_s.an and Brahman.aspati (but especially of Agni), is identical with Nairyosan.ha (Neryosangh), the name of an angel in the Zend-Avesta, who serves Ahuramazda as a messenger (see Vend. 22), in which capacity we find Agni, and Pu_s.an in the Vedic hymns also...The Vedic god Va_yu (wind, especially the morning wind), 'who first drinks the soma at the morning sacrifice', is to be recognized in the spirit Vayu of the Zend-Avesta, who is supposed to be roaming everywhere (see the Ra_m Yasht)...Vr.itraha, 'killer of Vr.itra (a demon)', one of the most frequent epithets of Indra in the Vedic books, is to be recognized in the angel Verethraghna (Behrqa_m Yasht)...Trita is identical with Thraetaona (Fre_du_n) in the Iranian legends...a similar close resemblance extends also to legends of heroic feats related in both scriptures (Veda and Zend-Avesta)...a great similarity in the rites of the two religions...The Yajishn or Ijashne ceremony, as performed by the Parsi

priests now-a-days contains all the elements which constitutge the different parts (four or seven) of the Jyotis.t.oma cycle of sacrifices, the prototype of all the Soma sacrifices...The Barsom (Baresma), or the bundle of twigs which is indispensable at the time of reciting Ijashne, is to be traced to one of the sacrificial rites at the great Soma sacrifices. It has hitherto been erroneously identified with the Barhis or sacred grass (Kus'a grass is used) of the Brahmans, which they spread at their sacrifices as a seat for the gods who are expected to come...As to cosmographical opinions the Brahmans divide the whole world into seven dvi_pas, the Parsis into seven ke_s'vars (karshvare in the Avesta), i.e., zones or regions. Both acknowledge a central mountain, which is called by the former Meru, by the latter Alborz (Haro_ berezaiti in the Avesta)..."(Haug, M., 1878, *Essays on Sacred Language of Parsis*, Trubner and Co., London, pp. 271-285).

Haug notes that in the Vedas, as well as in the older portions of the Zend-Avesta (see the Ga_thas), there are sufficient traces to discover that the Zoroastrian religion arose out of a vital struggle against the form which the Brahmanical religion had assumed at some early period. "...some might still be inclined to doubt whether the addherents of the Deva religion were actually the direct ancestors of the present Brahmans. It is true that the word deva and the cognate word dyaus are found in most of the Aryan languages with the meaning of 'heaven', or 'divine being', and the Deva-worshippers, combated by the Zoroastrians, might be another kindred tgribe of the Aryan stock, different from the Brahmans. But the fact that several of the Brahmanical Devas are mentioned by name in the Zend-Avesta, leaves no doubt whatever that the opponents of the Ahura religion actually were the ancient Brahmans; for the names of the Devas, mentioned in the Zend-Avesta, such as Indra, Sharva, Na_satya, are purely Brahmanical, and unknown to any other nation of the Aryan stock...These facts throw some light upon the age in which that great religious struggle took place...It must have occurred at the time when Indra was the chief god of the Brahmans...In the post-Vedic period, whose events called into existence the great epic poems Maha_bha_rata and Ra_ma_yan.a, we find Indra's place at the head of the gods occupied by the Trimu_rti of Brahma, Vis.n.u, and Shiva, which idea is utterly foreign to the Vedic hymns. The Trimu_rti never being alluded to in the Zend-Avesta, we must assign to the religious struggle a much earlier date...Under no circumstances can we aassign him a later date than BC 1000, and one may even find reasons for placing his era much earlier and making him a contemporary of Moses. Pliny, who compares both Moses and Zoroaster, whom he calls inventors of two different

kinds of magic rites, goes much further in stating that Zoroaster lived several thousand years before Moses (*Historia Naturalis*, 30.2)...”(Haug, M., opcit., pp. 287-289).

Zarasthushtra alludes to old revelations (Yas. XLVI.6), and praises the wisdom of Saoshyanto_, fire-priests (Yas. XLVI.3; XLVIII.12). He exhorts his followers to revere the Angra (Yas. XLIII.15), i.e. the Angiras of the Vedic hymns, who formed one of the most ancient and celebrated priestly families of the ancient Aryans, and who seem to have been more closely connected with the ante-Zoroastrian form of the Parsi religion than any other of the later Brahmanical families. Tghese Angiras are often mentioned together with the Atharvans or fire-priests (which word, in the form a_thrava, is the general name given to the priest caste in the Zend-Avesta), and both are regarded in the Vedic literature as the authors of the Atharvaveda which is called the Veda of the Atharva_ngi_ras, or the Atharva_n.a or Angi_rasa Veda of the Veda of the Atharvans or Angi_ras. (Haug, M., 1878, p. 294).

The word **ayanh** occurs with great frequency in the Avesta (Yas. 9.11; 11.7; 32.16; LI.9; Yt. 10.16, 132; 13.3; 19.40; Vend. 5.38). This is the equivalent of **ayas** in the R.gveda. In Yt. 10.96, the term used is: **zaro_is ayanho_ frahiktem**; here **ayanh** may refer to a ore or yellow metal or yellow ore. In Vedic, **ayas** denoted copper, brass (copper-brass) or bronze; it is likely that the Avestan had a similar meaning for the lexeme, **ayanh**.

“The language of the Avesta is most closely allied to the Sanskrit, though individually quite distinct from the latter. Together they may be classed as making up an Indo-Iranian group. Almost any Sanskrit word may be changed at once into its Avestan equivalent, or vice versa, merely by applying certain phonetic laws. As example may be taken the metrical stanza Yt. 10.6 in the Avesta: tem amavantem yazatem su_rem da_mo_hu sevis’tem miprem yaza_I zaopra_byo—Mithra that strong mighty angel, most beneficent to all creatures, I will worship[with libations—becomes when rendered word for word in Sanskrit:

Tam a_mavantam yajata_m s’u_ram dha_masu s’a_vis.t.ham mitram yaja_i hotra_bhyah. In its phonology, the Avesta agrees with the Sanskrit in its vowels in general...” (A.V. Williams-Jackson, 1892, *An Avestan Grammar in comparison with Sanskrit*, Stuttgart, W. Kohlhammer, pp. xxxi-xxxii)

The Saoshyanto_ or fire-priests (who seem to be identical with the Atharvans) who paved the way for the emergence of Zarathustra as the Chief Priest are dated to several thousand years before ca. 2000 BC. (Haug, M., 1878, p. 299). The separation between Brahmans and the followers of Ahura Mazda or the earlier Atharvans (Saoshyanto_), occurred only after Indra was dethroned. This should be a date well before the time when the events described in the Maha_bha_rata occurred, i.e. well before the beginning of the Kali Yuga, 3102 BC, by which date the Trimu_rti had replaced Indra to denote the chief(s) among the devas. If the Atharvans are dated earlier than the beginning of the Kali Yuga, the R.gveda should be dated centuries or even, thousands of years before such a date indicated for the Atharvan priests.

Pliny informs us (H.N. XXX,1,2) Eudoxus and Aristotle place Zoroaster 6,000 years before the death of Plato (i.e. 6350 BC), while Hermodorus, who was a disciple of Plato, following Eudoxus and Aristotle, fixes upon 5,000 years before the Trojan war (i.e., 6100 GBC). With the latter statement, Plutarch also agrees (the 'Isis", ch. 48) as well as Hermippus, according to the testimony of Pliny. (Willian Geiger and Fr. Von Spiegel, 1886, *The Age of the Avesta and Zoroaster*, trans. By D.D. Peshotan Sanja_na_, London, Henry Frowde).

Roth suggests that Zarathushtra is a goldsmith; zara = gold; Old Bactrian zairi = gold = Skt. Hari.

Varun.a is asura and a_ditya par excellence. (Rudolf Otto, *Das Gefuhl des Uberweltlichen*, Munichj, C.H. Beck'sche Verlangsbuchandlung, 1932; *The Kingdom of God and the Son of Man*, trans. By F.V. Filson and B.L. Woolf, London, Lutterwortfh Press, 1938, p. 128). Rudolf Otto surmises that Varun.a is medhira, wise and may correspond to Ahura Mazda_.

The asuras are: Varun.a (RV 1.24.14; 8.19.23; 42.1), Varun.a and Mitra (RV 1.151.4; 7., Rudra (RV 5.42.11; 2.1.6; 5.41.3), Agni (5.12.1; 5.15.1; 7.6.1; 3.29.11), Soma (9.74.7; 99.1), Savitr. (4.53.1; 5.49.2), Pu_s.an (5.51.11), A_dityas (8.27.20; Marut (1.64.2), Aryaman (5.42.1), Indra (1.174.1). The term 'asura' is also used as epithets of S'ambara, Namuci, Pipru, Varcin, Uran.a, Araru, Svarbha_nu, da_sas and Dasyus. (RV 6.10.4-13; 10.139.4; 8.32.2; 2.14.2; 2.16.8; 10.138.3; 7.99.5). The phrase dasyu_n asura_n is explained as: dasyus who were asuras (RV 5.29.9). Thus dasyus, who are the people of a region in general, can be asuras and they can also be non-asuras; thus dasyu may be either gods or demons. The term asura_ adeva_h is interpreted by

Sa_yan.a: adeva_h devavarjita_ devadvis.o ye asura_h santi, some asuras are adeva_h, i.e. without gods (who hate gods). (RV 8.96.9). The demoniacal connotation occurs only in 12 hymns of the Rgveda. (P.V. Bradke, *Dyaus Asura, Ahura Mazda und der Asuras*, Halle, Mas Niemeyer, 1885, p. 22). In many instances, the Rgveda uses the term 'asura' as a compliment. People prefer the asuras (RV. 1.151.3). Gods have faith in the power of the asuras. (RV. 10.151.3) [cf. Geldner's comment: The faith is here the faith in the superiority the acknowledgment of their power, which the later upcoming god-clans had created in the case of asura-clans. Cf. 10,24. The asuras are here indeed the opponents of gods, but not merely demons. (K.F. Geldner, *Der R.gveda*, Harvard University Press, 1951 reprint, vol. 3, p. 383, note to stanza 3)].

Yama in the R.gveda is the first one to die and have the status of the lord of the dead, the king of the netherworld. (RV 1.10; 10.12.6; 123.6; 154.4,5). In Avestan, Yima was the first man, first king and the son of Vivanhvat (Skt. Vivasvat). Ahura Mazda tells Yima to sustain and make the creatures prosper; Yima accordingly enlarges the earth three times to populate more people. Yima was the shepherd king and led the people to settled agricultural life. The deluge story was associated with Yima. (J. Darmesteter, The Zend Avesta, Vendidad, p. 10). R.gveda refers to Manu as Vivasva_n, son of Vivasvata and S'atapatha Bra_hman.a and Maha_bha_rata associate him with the flood (S'Br. 1.8.1.1-10; MBh. III.185 which also refers to Manu as the king of Badari).. The pura_n.ic accounts trace the ancestry of the candra-dynasty to Manu Vivasva_n. Avestan does not refer to Manu.



Raichur: Manu, as a na_gara_ja, seated on the fish of the deluge; sculpted on the naurangi darwasa, Raichur fort (Director of Archaeology, Hyderabad).

Yima the first mortal, the shepherd of Airya_na Vaejjo, by the good river Da_itya_ headed a meeting of the good mortals and celestial gods. Ahura Mazda also attended the meeting:

(22) And Ahura Mazda spoke unto Yima, saying: O fair Yima, son of Vivan.hvat! Upon the material world the fatal winters are going to fall, that shall bring the fierce, foul frost, upon the material world, the fatal winters are going to fall, thus shall make snow flakes fall thick…

(23) And all the three sorts of beasts shall perish…
(25) Therefore make thee a vara, long as a riding-ground on every side of the square and thither bring the seeds of sheep and oxen, of men, of dogs, of birds, and of red blazing fires…
(26)…there thou shall establish dwelling places…
(27) Thither thou shalt bring the seeds…
(33) And Yima made a vara, long as a riding ground…
(38)…That vara he sealed up with the golden ring and he made a door and a window self-shining within. (J.Darmesteter, *The Zend Avesta*, Vendidad, Fargard 2.21 ff.)

vara (fr. Root vr., cover) is explained as: enclosing, circumference, space, room (RV. 3.23.5); varfas = breadth, space, room (RV 1.190.2). Cognate lexemes in other ancient Indian languages: varaippu enclosure (Ta.); varu boundary, border (Ma.); baran:gayi limit, shore (Tu.); varuju ridge or dam dividing fields (Te.)(DEDR 5261). [cf. commentary of Fargard: "By him (Jamshed) the enclosure of Jam-kard was made; when there is that rain of Malakosa_n (Heb. Malko_s, rain] as it is declared in the religion, that mankind and the remaining creatures and creations of Hormazd, the lord, will mostly perish, then they will open the gate of that enclosure of Jam-kard, men and cattle and the remaining creatures and creation of the creator Hormazd will come from that enclosure and arrange the world again." (J.Darmesteter, *The Zend Avesta*, Vendidad, Fargard, p. 16, fn.1] The pura_n.ic account associates the fish with the flood; the Avestan account associates the enclosure with the rains which results in creatures perishing.

S'atapatha Bra_hman.a makes a distinction between devas and asuras in terms of their principal locus of activity: devas are cakramacara, those who move in carts; asuras are in s'a_las or workshops. (S'B.6.8.1.1-2). A legend also explains that the asuras were engaged in agriculture: "…The gods not approving (to share the sacrifice with seasons), the seasons went to the asuras, the malignant, spiteful enemies of the gods. Those (Asuras) then throve in such a manner that they (the gods) heard of it, for even while the foremost (of the Asuras) were still ploughing and sowing, those behind them were already engaged in reaping and threshing; indeed even without tilling, the plants ripened forth for them." (S'B. 1.6.1.2-4). It is also noted that when the devas and the asuras, both sons of Praja_pati were battling, all the herbs went ot the asuras and only udumbara, *ficus glomerata*, did not leave the devas. (S'B. 6.6.3.2); only yava, barley was left with the devas. (S'B 3.6.1.8-9). Funerary

rites had variations: "The devas drove away the asuras, the enemies, who were defeated from the world. Therefore, those children of the devas made square smas'a_nas. Thuse these Asuras and the easterners (make) round (ones). They who drove these (Asuras) from the world, arrange them between the two directions east and south as between these two directions is the gate of the pitr.loka, i.e. the world of the manes and causes them to enter the pitr.loka…the children of the devas make their sepulchres (mounds) so as not to be separate (from the earth), while those of the asuras, the easterners and others (make their sepulchral mounds) so as to be separated (from the earth) either on a basin or on some such thing." (S'B. 13.8.1.1ff; J. Eggeling, *S'atapatha Bra_hman.a*, *Sacred Books of the East*, vol. XII, Oxford, 1882, part V, pp. 429-430). Cha_ndogyopanis.ad (8.8.5) states:

tasma_d apy ayeha adada_namas'raddadha_namayajama_nam
a_hur asuro bateti
asura_n.a_m hyes.opanis.at
pretasya s'ari_ram bhiks.aya_ vasanenalam.ka_ren.eti
sam.skurvanti
etena hyamum lokam jes.yanto manyante

Therefore that person who is today not giving gifts, not having faith, not sacrificing is called asura indeed! This is the secret doctrine of the asuras in as much as they to embellish the body of the dead by food, garments and ornaments. They believe that they can conquer the next world by this. [bhiks., fr. Bhaj, to partake food; subhiks.a, abundance of food].

In RV 7.89.1, the prayer is to the great asura, Varun.a, who is requested not to send the singer to the chamber of clay (cf. AV 5.30.14).

Cha_ndogaparis'is.t.a notes that the pots of asuras are wheel-made while those of the devas are hand-made dishes:

asuren.a tu pa_tren.a yatra dadya_t tilodakam
pitastatra na_s'nanti das'avars.a_n.i pan~ca ca
kula_lacakraghot.itam a_suram mrn.mayam smr.tam
tadeva hastaghat.itam stha_lya_di daivikam bhavet

Wherever oblations are offered byu the asura-vessel the ancestors do not eat it for five to ten years. That earthen vessel which is formed on the potter's wheel

is known as the asura (vessel) and those dishes etc. which are handmade are known as daivika (of the devas) (Cha_ndogaparis'is.t.a, loc. Cit. R. Mitra, *Indo-Aryan, contributions towards the elucidation of their ancient and medieval history*, London and Calcutta, 1881, vol. 1, p. 274, fn.)

Antiquity of Avesta

The following notes are from the introduction to Zend Avesta by James Darmesteter. (*Sacred Books of the East, Vol. IV*, Oxford, Clarendon Press, 1895, pp. xiii-lxxxix).

“The disparaging meaning of the word Deva in Zoroastrianism was formerly interpreted as a sign that Zoroaster's religion was born in an Indo-Iranian period, from a moral reaction against Vedic polytheism, which sent to hell the former gods. This theory, as far as I can see, has no longer any supporter; it has been seen that it all rests on a few lexicographical particularities, not on inner historical evidence. In fact Zoroastrianism has much in common with the Vedic pantheon; its supreme God, Ahura Mazda, is not more different from the great Asura, Varun.a, than Zeus is from Jupiter; the Zoroastrian Apollo, Mithra, answers exactly to the Vedic Mitra. The worship is centred on both sides around the sacred plant (Soma—Haoma) and the sacred fire (Agni_--A_tar). The mythological struggle between the God of the Lightning, Indra, and the serpent Ahi is transferred to A_tar (the Fire) and Azi. Yama, son of Vivasvat, and Traitana revive in Yima, son of Vivanghan.t, and Thraetaona. How those analogies are to be accounted for, whether they are the relics of an old Indo-Iranian religion, or whether they have been , entirely or partly, borrowed from either side by the other, remains an open question, which we are neither prepared to answer in the negative, nor to answer it at all. But this much is clear that, there is not the slightest evidence or symptom of any such inner upheaval, rejecting a Vedic or quasi-Vedic religion, as was supposed to have taken place in prehistoric periods.

“This only remains, that when Zoroastrianism, with the exclusive character which belongs to moral religions, wanted to brand and condemn the most dangerous rival it encountered amongst its neighbours, it found no more characteristic name to designate the false gods and the demons than the name given to divine beings in the false religions of India which had so many

followers in the eastern provinces of the empire. It went so far as to take the names of three Indian devas to designate those arch-demons which it opposes artificially and systematically to the Amesha-Spentas; they are Indra, Saurva, and Naunghaithya, given as counterparts to Asha Vahu_ta, 'Perfect Righteousness'; Khshathra Vairya, 'Good Government'; and Spenta A_rmaiti_, 'Humility'. There is nothing in their Avesta character that reminds one of Indra the Storm God, of Sarva a name of S'iva, or of Na_satya the As'vin; they are Wickedness, Tyranny, and Pride, by the mere fact of their opposition ot the three Amshaspands, and it appears clear thereby that their present character is not the result of a prolonged evolution in the inner circle of Zoroastrianism.

"The Daeva Buiti who, by order of Angra Mainyu, tries to kill Zarathus'tra on his being born, is according to the Greater Bundahis' 'the demon who resides in the idols' (but), and is the same as Butasp worshipped in India. Butasp, the founder of the Samanean or Buddhist sect, is no less a personage than the Bodhisattva, from which it follows that Buiti is nothing but the object of the Buddhist worship, the Buddha, or better the Bodhi. In fact once Buiti is called Buidhi (Farg. XI, 9). Therefore, at the time when the legend of Zarathus'tra was written down, Buddhism was one of the religions with which he was supposed to have to struggle. The composer of the nineteenth Fargard of the Vendidad, therefore, knew of Buddhism, and this accounts for the striking analogies between the legend of Zarathus'tra's temptation by Angra Mainyu and S'akya's temptation by Mara. The Zoroastrian writer thought it fair to borrow such an edifying legend from the very religion he opposes.

"Another passage in the Yas'ts mentions controversies victoriously carried on by Zoroastrians against that impostor Gaotema. Here, again, it is striking to find Zoroastrians engaged in religious warfare with an enemy who bears one of the names of Buddha, Gotama. Controversies were to the taste of both sects: Gotama, in the Ja_takas, seems to pass all his life in confounding heretics; and late tradition ascribes to Zoroaster, as one of his most glorious feats, the defeat and conversion of a great Indian sage Kangragaka.

"Buddhism was brought beyond the Indus as early as As'oka's reign, though it was only under the Graeco-Bactrian kings (250-125 B.C.) and under the Indo-Greeks (first century before Christ) that it spread widely in the eastern provinces of Iran. One of the greatest Indo-Greeks, Menander—Milinda, was

revered as a Buddhist saint. In the middle of the first century B.C. Bactriana was famed for its Buddhist priests, the Shamans…

“We have already seen that Alexander was known to the composer of the Hom Yas’t, nay more, that it must be posterior to the fall of the Greek domination in Iran (about 150 B.C.). There was time enough for Greek influence to permeate the Zoroastrian schools, and so it did…

“The date of the Ga_tha_s, if not exactly determinable, may yet be fixed between rather narrow limits. They can hardly be older than the first century before our era, or even before Philo of Alexandria…They cannot be dated later than the time of the Scythian kings, Kanishka and Huvishka, who reigned in India between 78 and 130 A.D. and who left on their coins records of many Zoroastrian divinities, not only the elementary ones, like Mithra, Tighri, Va_ta, Maungha; but also the new abstract deities, like Vaian.ti, Verethraghna, and Amshaspand—Khshathra Vairya…

“The Ga_thas present therefore this apparent contradiction, that, being the oldest part of the Avesta, they represent, at the same time, the latest growth of the Zoroastrian spirit. This is contradictory only to those who in a text confound the date of its composition with the date of the ideas it expresses. The Vendidad may be at the same time later than the Ga_tha_s in its composition and older in its material. The writer of the Vendidad has the Ga_thas before his eyes, though he expressed ideas and facts far anterior to the time when the Ga_thas could have been written or thought of.

“…As to the country to which it belonged (Zend language), only one thing can be safely affirmed: it was not Persia. It may have been Media, which remains to the last the center of Zoroastrianism and the Zoroastrian priesthood; it may have been the eastern part of Iran, where a modern dialect, the Afghan, appears to be a lineal descendant of the Zend.”
This brings Avestan, as a language, close to the borders of Vedic India.

The parallels noted between the Avestan tradition and the Pura_n.a tradition point to the possibility that the Avestan mythology was post-Rigvedic.

The Zend Avesta prescribes rites similar to those of the Bra_hman.as.

Avestgan yajishn is a Haoma sacrifice and has all the components of jyotis.t.oma or soma sacrifice cycles, the opening yajn~a of this cycle being agnis.t.oma. In agnis.t.oma meat and animal parts are thrown into the fire and partaken by the priest and the sacrificer (yajama_na); in Avestan Yajishn, animals are not killed; instead, some hairs of an ox are placed in a small vessel and shown to fire which is kept burning by offerings of wood. Yajurveda notes metres names as ga_yatri_-a_suri, us.n.ih-a_suri_.

Agnis.t.oma is Agni. It is called so, because they (the gods) praised him with this stoma. They called it so to hide the proper meaning of the word; for the gods like to hide the proper meaning of words. (Martin Haug, *Aitareya Bra_hman.a*, pp. 161-2). Aitareya Bra_hman.a notes (3.49) that the devas took shelter in agnis.t.oma and the asuras took refuge in the uktha. "Ukthya is a slight modification of agnis.t.oma sacrifice…Ukthya is an older name for s'astra, i.e., a recitation of one of the hotr. Priests at the time of the soma libations. Agnis.t.oma has twelve recitations and the ukthya has fifteen. The first twelve recitations of the ukthya are the same as those of the agnis.t.oma, to these three are added, which are wanting in the agnis.t.oma." (Martin Haug, *Aitareya Bra_hman.a* p. 170, fn. 16). R.gveda notes that the asuras had entered the ukthas (s'astras); but no one else sees them. Agni turned into a horse, ran against the asuras and overtook them. (RV 6.16.16; Haug, opcit., pp. 170-171).

The term, 'itara_ girah' refers to other praises, i.e. of the asuras who use uktha as eulogy:

एह्य् ऊ॒ षु ब्र॑वाणि॒ ते॑ ऽग्न इ॒त्थेत॑रा॒ गिरः॑ ।

ए॒भिर् व॑र्धास॒ इन्दु॑भिः ॥

6.016.16 Come, Agni, that I may address to you other praises in this manner; augment with these libations. [Other praises in this maner: ittthetara_ girah = ittha, anena praka_ren.a, thus, in this manner; also, offered by others, or by the asuras, asuraih kr.ta_; Aitareya Bra_hman.a 3.49 cites this r.ca: other than those offered to the gods, or adverse to the gods, propitiatory of the asuras, asurebhyah hitah devava_kya_ditara devavirodhinya ityarthah].

"The contrivances used for obtaining the Soma juice as well as the vessels employed are somewhat different, but on closer inquiry, an original identity may be recognized. No juice is thrown into fire by the Parsi priests but on the

contrary the Bra_hman.a priests offer them to the gods by throwing it into fire.” Vedic practice includes purod.a_s’a as havya; Avestan practice has darun, a bread. Avestan ishti and azuiti are comparable to Vedic practices of is.tg.i and a_huti; Haug notes: “…the original peculiar significatgions are lost and only the general meanings ‘gift’ and ‘invocation or praise’ have survived”. Haug also notes the similaries between Avestan A_frin:gan ceremony and the Bra_hman.a A_pri ceremony; between Avestan Darun and Bra_hman.a Dars’a-pu_rn.ama_sa-is.t.i; between Avestan Gahanbar (celebrated six times a year) and Bra_hamn.a ca_turma_sya. The functions of Avestan Zaota priest are similar to those of Vedic Hota_, who recites the r.cas of R.gveda; of Avestan Rathwi, the assistant of Zaota, are similar to the Vedic Adhvaryu, who manages the yajn~a; of Bra_hman.a agnidhra are similar to those of Avestan Atarevaksho. In Barashnom of nine nights, a purification ceremony, a pan~cagavyam or five products of the Gomez (cow) is used. Similarly, Avestan tradition enjoins the use of aiwyonhanem, an investiture of the sacred thread, comparable to the Bra_hman.a yajn~opavi_ta. (Martin Haug, .*Essays on the sacred language, writings and religion of the Parsis*, ed. By E.W. West, London,, 1883, pp. 279-286).

Asura has bowed down to Indra (RV 1.131.1), though Asura has won the sun (svarvidam asuarm: RV 10.56.6):

इन्द्राय हि द्यौर् असुरो अनम्नतेन्द्राय मही पृथिवी वरीमभिर्

द्युम्नसाता वरीमभिः ।

इन्द्रं विश्वे सजोषसो देवासो दधिरे पुरः ।

इन्द्राय विश्वा सवनानि मानुषा रातानि सन्तु मानुषा ॥

1.131.01 To Indra heaven, that excludes the wicked, verilyhas bowed; to Indra the wide-spread earth (has offered homage) with acceptable (praises); with acceptablepraises (the worshipper has propitiated Indra) for the sake of food; all the gods well pleased have given precedence to Indra; let all the sacrifices ofmen (be appropriated) to Indra; let all the offerings of menbe (presented to him).

From the cosmogony su_kta in R.gveda, 3.38 the following hymns refer to the asuras and asuric forms and to the oldest bull, the Asura, the creator.

आतिष्ठन्तम् परि विश्वे अभूषञ् छ्रियो वसानश् चरति स्वरोचिः ।
महत् तद् वृष्णो असुरस्य नामा विश्वरूपो अमृतानि तस्थौ ॥
त्रीणि राजाना विदथे पुरूणि परि विश्वानि भूषथः सदांसि ।
अपश्यम् अत्र मनसा जगन्वान् व्रते गन्धर्वाँ अपि वायुकेशान् ॥
तद् इन् न्व् अस्य वृषभस्य धेनोर् आ नामभिर् ममिरे सक्म्यं गोः ।
अन्यद्-अन्यद् असुर्यं वसाना नि मायिनो ममिरे रूपम् अस्मिन् ॥
युवम् प्रत्नस्य साधथो महो यद् दैवी स्वस्तिः परि णः स्यातम् ।
गोपाजिह्वस्य तस्थुषो विरूपा विश्वे पश्यन्ति मायिनः कृतानि ॥

3.038.04 They all ornamented (Indra) standing (in his car) and, clothed in beauty, he proceeds self-radiant; wonderful are the acts of that showerer (of benefits), the influencer (of consciences), who omniform, presides over the ambrosial (waters). [The influencer of consciences: the text has only asurasya; the term is explained by prerakasya antarya_mitava, impeller, from being in the inner spirit].

All surrounded him as he mounted the (chariot). Putting on his insignia, the self-illuminating one moves about. This is the great name of the Bull Asura; he has taken an immortal name as Vis'varu_pa. (Geldner).

3.038.06 Royal Indra and Varun.a, embellish the three universal sacrifices (and make them) full (of all requisites) for this celebration; you have gone to the rite, for I have beheld in my mind, at this solemnity, the gandharvas with hair (waving) in the wind. [The gandharvas: gandharva_n va_yukes'a_n: the gandharvas are the guardians of the Soma, somaraks.aka_n; similar beings are cited in Taittiri_ya: sva_nabhra_ja_n, bambha_re, hasta, suhasta, kr.s'a_n.ahete vah somakrayan.a_s, ta_n raks.adhvamma_ vo dabhan].

You (both) the kings in your wisdom occupy the three, the many, all seats. I saw going there by my mind also the gandharvas in your service, whose hair are the winds. (Geldner).

3.038.07 Those who, for (the sake of) the showerer (of benefits), milk the agreeable (produce) of the cow, (who is known) by (many) names, they invested with the diversified strength (of the asuras) and practising delusive art have deposited their own nature in him.

This is (the work) of him who is the bull and cow. They have supplied the companions of the cow with names. While they always assumed other asuric (forms), the magicians have adjusted their forms to him. (Geldner).

3.038.09 You two secure the great felicity of the ancient (worshipper), that which is happiness in heaven; do you (therefore) be even about us; all those who exercise illusion, contemplate the manifold expoits of the everlasting and blandly-speaking Indra. [All those who exercise illusion: vis've ma_yinah = sarve deva_h, all the gods; ma_ya_ also signifies wisdom, intelligence,hence, may also mean the wise; ma_ya = deceivers, or asuras].

You two carry on (the work) of the great and ancient one (i.e. the asura referred to in hymn 4). As divine well-being you may be arouns us as many-formed protectors of the living creatures (?), of the immovable. All see the deeds of the magician.

The following su_kta (10.177) of the R.gveda is addressed to ma_ya_bheda; this is to speech which is a wonder, a magic or creative power of the Asura.

r.s.i: patan:ga pra_ja_patya; devata_: ma_ya_bheda; chanda: tris.t.up, 1 jagati_

पतंगम् अक्तम् असुरस्य मायया हृदा पश्यन्ति मनसा विपश्चितः ।
समुद्रे अन्तः कवयो वि चक्षते मरीचीनाम् पदम् इच्छन्त ॥
पतंगो वाचम् मनसा बिभर्ति तां गन्धर्वो ऽवदद् गर्भे अन्तः ।
तां द्योतमानां स्वर्यम् मनीषाम् ऋतस्य पदे कवयो नि पान्ति ॥
अपश्यं गोपाम् अनिपद्यमानम् आ च परा च पथिभिश् चरन्तम् ।
स सध्रीचीः स विषूचीर् वसान आ वरीवर्ति भुवनेष्व् अन्तः ॥

10.177.01 The wise behold their mind; (seated) in their heart the Sun made manifest by the illusion of the asura; the sages look into the solar orb, the ordainers (of solar worship) desire the region of his rays. [Illusion of the asura: asurasya = the supreme Brahma devoid of all disguise; aktam ma_yaya_ = united, to knowledge, all-knowing. Sa_yan.a: asurasya asanakus'alasya sarvopa_dhivihi_nasya parabrahman.ah sambandhinya…ma_yeti prajn~a_na_ma…patan:gam/patati gacchati_ti patan:gah su_ryah; 'Of the Asura (means)_ of one skilled in throwing, of one who is devoid of any attributes, connected with the Ultimate Reality…ma_ya_ is wisdom…patan:ga that which flies means goes, the bird (is) the sun'.].

The eloquent ones see in the heart, in the mind, the bird, anointed by the magic of Asura. In the middle of the ocean seers perceive (him); the masters search the track of the light rays. (Geldner).

10.177.02 The Sun bears the (sacred) word in his mind the Gandharva has spoken it, (abiding) within the womb; sages cherish it in the place of sacrifice, brilliant, heavenly ruling the mind. [Sacred word: va_k: the three Vedas; Taittiri_ya Bra_hman.a 3.12.9: in the morning the deity moves in the sky with the hymns of the R.k, he abides at noon in the Yajurveda, at his setting he is extolled with the Sa_maveda; the sun moves accompanied by the three Vedas; gandharva: from gah (voices), and dhr. (to hold) = the breath of life].

The bird bears in mind the speech. The gandharva declared this, in the mother's womb. The seers protect this illuminating solar (?) knowledge in the search of truth. (Geldner).

10.177.03 I beheld the protector (the Sun), never descending, going by his paths to the east and to the west; clothing (with light) the (four) quarters of heaven and the intermediate spaces, he constantly revolves in the midst of the worlds.

I saw the herdsman going to and fro on his way, without resting. He conceals himself in the waters which run in the positive and negative direction and he moves to and fro in the creatures. (Geldner).

The imagery of the bird (patan:ga) in relation to the sun is continued by referred to Garutmat and Savita_:

पश्चेदम् अन्यद् अभवद् यजत्रम् अमर्त्यस्य भुवनस्य भूना ।

सुपर्णो अङ्ग सवितुर् गरुत्मान् पूर्वो जातः स उ अस्यानु धर्म ॥

10.149.03 Afterwards arose this other adorable (deity), together with the host of the immortal world, the brightwinged Garutmat, born before Savita_ obeyed his law. [Garutmat: An allusion to Garud.a's having brought the Soma from the moon at Savita_'s command].
Afterwards the other holy one originated with the multiplicity of the immortal one. Garutma_n suparn.a was definitely born first from Savita_ and also, according to his ordinance. (Geldner).

वि सुपर्णो अन्तरिक्षाण्य् अख्यद् गभीरवेपा असुरः सुनीथः ।
क्वेदानीं सूर्यः कश् चिकेत कतमां द्यां रश्मिर् अस्या ततान ॥

1.035.07 Suparn.a, (the solar ray), deep-quivering, life-bestowing, well-directed, has illuminated the three regions. Where now is Su_rya Who knows to what sphere his rays have extended? [supran.a = well-winged, a synonym of ras'mi, a ray; asura, fr. asu, vital breath; ra, who gives, hence life-giving].
The eagle (suparn.a) has reviewed the air (antariks.a), the secretly speaking Asura, the good pointer (guide). Where is now the sun? Who knows it? Which heaven has its rays permeated? (Geldner).

"The original texts of Avesta were not written by Persians, as they are in a language which was not used in Persia, they prescribe certain customs which were unknown to Persia… (the language of Avesta is identified with) the Talis dialect (spoken) on the southern bank of Aras.' (J. Darmesteter, Vendidad, p. li). Aras river is the Araxes river. It is possible that a community of languages existed when Zarathustra presents his arguments. (W.Geiger, *Civilization of the eastern Iranians in the ancient times, with an introduction on the Avesta religion*, Vol. I, Ethnography and Social Life, London, Henry Froude, 1885, pp. 13 ff. 225).

The cylinder seal of Darius dated to ca. 500 B.C. depicts the king with Ahura Mazda, in the winged disc. (R. Ghirshman, *Persia from the origins to Alexander*, USA, Thames and Hudson, 1964, pp. 268-169).

प्रवो महे सहसा सहस्वत उषर्बुधे पशुषे नाग्नये स्तोमो
बभूत्वग्नये ।

प्रति यद् ईं हविष्मान् विश्वासु क्षासु जोगुवे ।
अग्रे रेभो न जरत ऋषूणां जूर्णिर् होत ऋषूणाम् ॥

1.127.10 May your praise, (oh priests), become grateful to Agni, who is desrving of laudation, who is of strength to overcome the strong, who is awakened at the dawn; to Agni, as if to a giver of cattle. Inasmuch as the presenter of the oblation repairs assiduously to every altar, the invoking priest, well-skilled in (pious) praise, glorifies him (Agni) as the first of the attaining (divinities), as a herald (recites the praises) of illustrious (men). [The last pa_da: lit. 'in front, a herald, like praisers of the illustrious (r.s.u_n.a_m)].

अग्निं द्वेषो योतवै नो गृणीमस्य् अग्निं शं योश् च दातवे ।
विश्वासु विक्ष्व् अवितेव हव्यो भुवद् वस्तुर् ऋषूणाम् ॥

8.071.15 We praise Agni that he may keep off our enemies; we praise Agni that he may give us joy and security; he may be worshipped as the giver of dwellings to the r.s.is; he who is as it were the protector of all men. [r.s.u_n.a_m, = r.s.i_n.a_m].

अयं स यस्य शर्मन्न् अवोभिर् अग्नेर् एधते जरिताभिष्टौ ।
ज्येष्ठेभिर् यो भानुभिर् ऋषूणाम् पर्येति परिवीतो विभावा ॥

10.006.01 This is that Agni by whose protections the worshipper (diligent) in sacrifice prospers in his dwelling; who is radiant, travels everywhere invested with the excellent splendours of his rays. [r.s.u = flame, glow; r.s.u_n.a_m = su_ryaras'mi_na_m].

[RV also has uses the term, r.s.is.a_n.a = offered by the sages, r.s.ibhih sambhakta (soma)(RV. 9.86.4)].

प्र त आश्विनीः पवमान धीजुवो दिव्या असृग्रन् पयसा धरीमणि ।
प्रान्तर् ऋषय स्थाविरीर् असृक्षत ये त्वा मृजन्त्य् ऋषिषाण वेधसः ॥

9.086.04 Purified (Soma), your celestial steed-like (streams) as quick as thought are poured along with the milk into the receptacle; the r.s.is, the ordainers (of sacrifice), who cleanse you, O r.s.i-enjoyed (Soma), pour your continuous (streams) into the midst (of the vessel).Thus Rashanu (Av.) may be equated with R.s.i s.a_n.a (RV.), or soma enjoyed by the r.s.is.

वरुणं वो रिशादसम् ऋचा मित्रं हवामहे ।
परि व्रजेव बाह्वोर् जगन्वांसा स्वर्णरम् ॥

5.064.01 We invoke you, Mitra and Varun.a, with this hymn; each the discomfiter of foes, the conductor to heaven, like (two herdsmen) driving, by (the strength of their) arms, the herds of cattle before them. [svarn.ara = a_dityapurus.ah, the resplendent male (presiding deity of the sun); jaganva_sa_ svarn.aram svargasya neta_ram varun.am].

यज्ञेन वर्धत जातवेदसम् अग्निं यजध्वं हविषा तना गिरा ।
समिधानं सुप्रयसं स्वर्णरं द्युक्षं होतारं वृजनेषु धूर्षदम् ॥

2.002.01 Exalt with sacrifice, Agni, who knows all that has been born; worship him with oblations, and with ample praise; him who is well kindled, well fed, much lauded, resplendent, the conveyer of oblations, the giver of strength (to the body).[svarn.aram = an epithet of Agni, samidha_na svarn.aram].

मन्दस्वा सु स्वर्णर उतेन्द्र शर्यणावति ।
मत्स्वा विवस्वतो मती ॥

8.006.39 Rejoice, Indra, at the heaven-guiding sacrifice as S'aryan.a_vat; be exhilarated by the praise of the worshipper. [Heaven-guiding: or, to be offered by all the priests, svarn.are = sarvair r.tvigbhir netavye; S'aryan.a_vat: the country of Kuruks.etra and S'aryan.a_vat is a lake in the neighbourhood]. [sarver..tvigbhih netavye yajn~e; svarn.ara = an epithet of Soma].

येना दशग्वम् अध्रिगुं वेपयन्तं स्वर्णरम् ।
येना समुद्रम् आविथा तम् ईमहे ॥

8.012.02 We solicit that (exhilaration) whereby you have defended Adhrigu, the accomplisher of the ten (months' rite), and the trembling leader of heaven, (the sun), and the ocean. [Trembling:darkness-dispelling, all-leading, tama_m.si varjayantam sarvasya neta_ram su_ryam]. [sarvasya neta_ram su_ryam; svarn.ara = svarn.r.u, hero or light of heaven, i.e. all-refulgent; svarn.ara = name of one of the Manes].

Thus, Xwarenah (Av.) = svarn.ara, the effulgent Sun.

शवसा ह्य् असि श्रुतो वृत्रहत्येन वृत्रहा ।
मघैर् मघोनो अति शूर दाशसि ॥

8.024.02 You (Indra) are renowned for strength; from the slaying of Vr.tra, you are (famed as) Vr.trahan; you surpass, hero, the opulent in the donation of your riches. [vr.traha_ = s’atruhanta_, killing Vr.tra or foe; jyes.t.ham vr.traha s’avah].

यज् जायथा अपूर्व्य मघवन् वृत्रहत्याय ।
तत् पृथिवीम् अप्रथयस् तद् अस्तभ्ना उत द्याम् ॥

8.089.05 Maghavan, who had none before you, when you were born for the slaying of Vr.tra, then you did spread abroad the earth, then you did prop up the heavens. [yajja_yatha_ vr.trahatya_ya, when you were born tfor the Vr.tra fight].

अयम् अग्निः सुवीर्यस्येशे महः सौभगस्य ।
राय ईशे स्वपत्यस्य गोमत ईशे वृत्रहथानाम् ॥

3.016.01 This Agni, is the lord of heroism and of great good fortune; he is the lord of wealth comprising progeny and cattle; he is the lord of the slayers of Vr.tra; [vr.trahatha_na_m i_s'e: vr.tra may imply an enemy, or iniquity; tvayi

samarpita karma_n.a_m asma_kam tvat prasa_da_t pa_paks.ayo bhavati, through your favour is the destruction of the sins of us whose good works have been delivered to you]. [vr.trahatha = Vr.tra slaying, battle].

AV 4.24.1 uses the term, vr.traghna:

indrasya manmahe s'as'vadidasya manmahe vr.traghna stoma_ upa mema a_guh
yo da_s'us.ah sukr.to havameti sa no mun~catvahasah

4.24.1 We reverence Indra; constantly do we reverence him; these praise-hymns (stoma) of the Vr.tra-slayer have come unto me; he who goes to the call of the worshipper (da_s'vans), of the well-doer—let him free us from distress. [vr.trahan = vr.trahanta_. The clash of the well-doer and the evil-doer is a constant theme of Yas'ts of Avesta].

Athari, athari_ = flame, tip (RV. 4.6.8); atharyu = flaming (RV 7.1.1 gr.hapatimatharyum, a_gamyama_namatanavantam va_h); atharvan = agnipurohita; atharvi_ = priestess (RV. 1.112.10; ya_bhirvis'pala_m dhanasa_madathavyem agacchanti_m; RV. 10.120.9 atharva_vocat, atharvan.ah putro br.haddiva_khya_ r.s.ih; RV. 9.11.2 abhi te madhuna_ payotharva_n.o as'is'rayuh ayarva_n.a r.s.yah); atharvan = the spells seen by Atharvan, atharvaprokta mantrah; bhes.ajam vai deva_na_matharva_n.ah, atharvan.a_ r.s.in.a_ pro_kta_ mantra_h: TMB 16.10.10); atharva_n:girasas = atharva and an:giras, members of the sacerdotal class or race called atharvan and an:giras; or hymns composed by Atharvans and An:girasas = Atharvaveda.

अग्निं नरो दीधितिभिर् अरण्योर् हस्तच्युती जनयन्त प्रशस्तम् ।
दूरेदृशं गृहपतिम् अथर्युम् ॥

7.001.01 Men generate the excellent, far-gleaming master of the mansion, the accessible Agni, present in the two sticks by attrition with their fingers[atharya: a_gamya atanavat, not spreading or dispersing].

द्विर् यम् पञ्च जीजनन् संवसानाः स्वसारो अग्निम् मानुषीषु विक्षु ।

उषर्बुधम् अथर्यो न दन्तं शुक्रं स्वासम् परशुं न तिग्मम्.

4.006.08 Agni, whom the twice five sisters dwelling among men, the descendants of Manu, have engendered, like females, (awaking) him at awn, feeding on oblations, brilliant of goodly aspect, and shharp as an xe. [Twice five sisters: the fingers employed in producing fire by attrition].

एवा महान् बृहद्दिवो अथर्वावोचत् स्वां तन्वम् इन्द्रम् एव ।

स्वसारो मातरिभ्वरीर् अरिप्रा हिन्वन्ति च शवसा वर्धयन्ति च ॥

10.120.09 Thus the great Br.haddiva, son of Atharvan, repeated his diffused (praise) to Indra. The unsullied siister (streams) abiding in the mother (earth), to Indra, and augment him with strength. [The r.ca is ascribed to r.s.i: br.hadedeva_ atharvan.a]

अभि ते मधुना पयो ऽथर्वाणो अशिश्रयुः ।

देवं देवाय देवयु ॥

9.011.02 The Atharva_n.a have mixed with sweet milk for the deity (Indra) your divine and god-devoted (juice). [The Atharva_n.a = the priests; have mixed with sweet milk: payah is taken to be instrumental; i.e., the meaning should be: 'have mixed milk with your juice']. [The devata_ is pavama_na Soma].

याभिर् विश्पलां धनसाम् अथर्व्यं सहस्रमीळ्ह आजावजिन्वतम् ।

याभिर् वशम् अश्व्यम् प्रेणिम् आवतं ताभिर् ऊ षु ऊतिभिर्

अश्विना गतम् ॥

1.112.10 With those aids by which you enabled the opulent Vis'pala_, when she was unable to move, to go to the battle rich in a thousand spoils, and by which you protected the devout Vas'a, the son of As'va; with them, As'vins, come willingly hither. [Vis'pala_ was the wife of Khela, son of Agastya. Vas'a and Asva were r.s.is].

Vedic and Avestan

Hillebrandt (*Vedic Mythology*, 1981, vol.2 (repr.), pp. 270-271) provides some insightful observations pointing to the links between Vedic India and Avestan Iran:

> "...I wish to limit my ask to making a beginning of the investigation in the hope that others would continue it. I give below predominantly such material where contacts with Iran can be assumed...TS 6.4.10.1: br.haspatir deva_na_m purohita a_si_c chan.d.a_marka_v asura_n.a_m...(MS 4.6.3 (81.1); S'BR 4.2.1.6)...In the course of the Agnis.t.oma both receive two Grahas, the S'ukragraha and the Manthingraha, which are late additions in the sacrifice...marka is the same as Avestan mahrka and denotes 'death'..s'an.d.a...recalls the name of the s'an.d.ikas, to be found among Indra's enemies...TMBr 7.5.20: us'ana_ vai ka_vyo 'sura_n.a_m purohita a_si_t (TS 2.5.8.5; S'S'S 14.27.1; Geldner, VSt, II, p. 166) tam deva_h ka_madugha_bhir upa_mantrayanta tasma_ etak_ny aus'ana_ni pra_yacchan (Comm.: us'ana_ na_ma kaveh putrah asura_N.a_m virocana_di_na_m purohitah...). Us'anas, whom the later Vedic texts associate with Indra a few times and make him a wise man and magician, is assigned here to the Asuras as the Purohita and likewise in the latter literature (MBH 1.76). Although etymologically somewhat different, he is not distinct from the most famous Iranian, Kai Ka_o_s, who is equated since long with the Kavi Kava usa..." (Cf. Spiegel, *Die arische Periode*, p. 284 ff.; Tiele, *Geschichte der Religion im Altertum bis auf Alexander den Grossen*, II, p. 72; Noldke, *Grundriss der iranischen Philologie*, II, p. 190, n.2. Contra Bartholomae, *Altiranisches Worterbuch*).

We will follow this lead in interpreting concordance and chronology between Vedic and Avestan in relation to: Vivasvan, Yama, Trita, Thrae_taona and also Kavi Us'anas).

Kavi Us'anas, les kavis et les karpans -- the kavis and the karapans, the singers and the smiths

The break-out of the kavi's from India into Iran can be explained as an ongoing search for minerals -- tin, copper, gold, silver -- in an evolving bronze age.

> [Note the concordance between karapan and kr.pa_n.a: sword (Pa_N. 2.7-2, 18 Pat.); a sacrificial knife; a pair of scissors, a dagger, a knife (Skt.lex.)]

जरतीभिर् ओषधीभिः पर्णेभिः शकुनानाम् ।

कार्मारो अश्मभिर् द्युभिर् हिरण्यवन्तम् इच्छतीन्द्रायेन्दो परि स्रव ॥

> 9.112.02 (R.s.i: S'is'u A_n:girasa; devata_: Pavama_na Soma) With dried plants (are arrows made), with the feathers of birds (and) with glistening stones; the smith seeks a man who has gold; flow, Indu, for Indra.

It is notable that two r.cas (RV 1.51.10 and RV 4.16.2) make a reference to 'us'anas' in the context of prayer to Indra; and in r.ca RV 1.51.10, the reference is emphatially related to a 'taks.a' which is explained as 'sharpening', a clear metallurgical or 'smithy' term. In two r.cas RV 10.49.3 and 10.99.9, the refernce to Kavi is in the context of 'weapons' and the slaying of S'us.n.a. The other r.cas refer to Us'ana_ (or Kavi or son of Kavi) and Kutsa and in the context of the legend of S'us.n.a. {s'us.n.a = fire (Skt.lex); cun.n.am = lime, oxide of calcium}

> Hillebrandt (Alfred Hillebrandt, 1981, *Vedic Mythology*, Vol. II, pp. 164-172) notes that the name Kutsa is encountered in the rite of buying the Soma. "The Soma seller is regarded as a contemptible person. In the ritual literature a Kautsa is mentioned as the Soma seller (either alone or alternating with a S'u_dra). Baudha_yana states as follows in the Agnis.t.omabha_ga, 15: athaina_m (somakrayan.i_m) pradaks.in.am a_vr.tya_dbhir abhyuks.yodi_ci_m utsr.jati sais.a_ kautasya bhavati atha kautsa_d ra_ja_nam a_datte...yajama_nam adbir abhyuks.ya kautsa_ya va_ parikarmin.e vos.n.i_s.am prayacchati (A_pS'S 10.20.12: kautsa_d ra_ja_nam kri_n.i_ya_d anyasma_d va_ bra_hman.a_d

ity uktvya_ha_py abra_hman.a_d iti). Ka_tya_yana also states that the Soma seller is a Kautsa or a S'u_dra (VII.6.3.4); on this the commentary remarks that a Kautsa is from the same gotra as Kutsa whereas others pine that a Kautsa is one whose conduct is despicable. Perhaps the two meanings are not far apart. Probably the contempt attached to Kutsa which is expressed in the derivatives like kutsana, kutsay and also in Pa_li kuccha_ has its origin in the despicable position assigned for unknown reasons to the Kutsas by the Vedic clans, in spite of the former's independent participation in the composition of the mantras...A_pS'S XXIV.8 enumerates a_n:girasa, ma_ndha_tra and kautsa as the trya_Rs.eya of the Kutsas...The most significant trait in the family tradition of the Kutsas is the participation of their progenitor in the battle against S'us.n.a. Just as Atri sets the sun free... so does Kutsa wrest the sun's wheel from S'us.n.a... Only in about seven passages Kutsa and S'us.n.a are mentioned besides Indra (RV 1.51.6; 63.3; 2.19.6; 5.31.7; 7.19.2; 10.49.3; 99.9)....{S'us.n.a} The problem would be easily solved if we simply follow Sa_yan.a who renders the word in the majority of cases as s'os.aka and explains him as an Asura. Then the s'os.aka would be the 'scorcher' who seizes the sun's wheel about the time of the summer solstice and scorches everything..." and goes on to see an association between Kutsa and the sun.

The association of Kutsa and Soma

अध्वर्यवो यः शतम् आ सहस्रम् भूम्या उपस्थे ऽवपज् जघन्वान् ।
कुत्सस्यायोर् अतिथिग्वस्य वीरान् न्य् आवृणग् भरता सोमम् अस्मै ॥

2.014.07(R.s.i: Gr.tsamada S'aunahotra) Priests, present the Soma to him, who, slaying hundreds and thousands (of asuras),

cast them down upon the lap of the earth; who destroyed the assailants of Kutsa, A_yu and Atithigva.

त्वम् आविथ सुश्रवसं तवोतिभिस् तव त्रामभिर् इन्द्र तूर्वयाणम् ।
त्वम् अस्मै कुत्सम् अतिथिग्वम् आयुम् महे राज्ञे यूने अरन्धनायः ॥

1.053.10 (R.s.i: Savya A_n:giras) You, Indra, have preserved Sus'ravas by your succour, Turvaya_n.a by your assistance; you have made Kutsa, Atithigva, and A_yu subject to the mighty though youthful Sus'ravas.

> [Hillebrandt notes that the Kutsa who had been abandoned by Indra and handed over to his enemies bears the epithet athithigva a_yu (vol. 2, p. 168); so is Tu_rvaya_n.a, 'the youthful king' an enemy and so is Sus'ravas.]

प्र तत् ते अद्या करणं कृतम् भूत् कुत्सं यद् आयुम् अतिथिग्वम् अस्मै ।
पुरू सहस्रा नि शिशा अभि क्षाम् उत् तूर्वयाणं धृषता निनेथ ॥

6.018.13 That exploit is celebrated in the present day (which you have) achieved for Kutsa, for A_yu, for Atithigvava; to him you have given many thousands (of riches), and you have quickly elevated Turvaya_n.a over the earth by your power. [Turvaya_n.a: same as Divoda_sa, to whom Indra gave the spoils of S'ambara].

Griffith notes: 'Sa_yan.a represents the exploit as having been achieved for Kutsa, A_yu and Atithigva, but this is not the meaning of the words of the text...according to Sa_yan.a, tu_rvaya_n.a, 'quickly going', is an epithet of Divoda_sa'.

'The word Kutsa (apart from its identity as a synonym of the thunderbolt) is found in the Rigveda in the names of two perons: the King Purukutsa and the R.s.i Kutsa. Purukutsa is a king of the Tr.ks.i (Iks.va_ku) dynasy; and the R.s.i Kutsa, as per tradition (outside the Rigveda), was also the son of an Iks.va_ku king.' (Talageri, 2000, opcit., p. 92).

यद् इन्द्र नाहुषीष्व् आओजो नृम्णं च कृष्टिषु ।
यद् वा पञ्च क्षितीनां द्युम्नम् आ भर सत्रा विश्वानि पौंस्या ॥

यद् वा तृक्षौ मघवन् द्रुह्याव् आ जने यत् पूरौ कच् च वृष्ण्यम् ।
अस्मभ्यं तद् रिरीहि सं नृषाह्ये ऽमित्रान् पृत्सु तुर्वणे ॥

6.046.07 Whatever strength and opulence (exist) among human beings, whatever be the sustenance of the five classes of men, bring Indra to us, as well (as) all great manly energies. 6.046.08 Whatever vigour, Maghavan, (existed) in Tr.ks.u, in Druhyu, in Puru, bestow fully upon

us in conflicts with foes, so that we may destroy our enemies in war.

[Alt. trans. (Griffith): All strength and valour that is found, Indra, in tribes of Nahus.as, and all the splendid fame that the Five tribes enjoy, bring all manly powers at once. Or, Maghavan, what vigorous strength in Tr.k.s.i lay, in Druhyus or in Pu_ru's fok, fully bestow on us, that, in the conquering fray, we may subdue our foes in fight.]

The r.ca of Sobhari ka_n.va (RV 8.22.7) is emphatic that Tr.ks.i is the son of Trasadasyu:

उप नो वाजिनीवसू यातम् ऋतस्य पथिभिः ।
येभिस् तृक्षिं वृषणा त्रासदस्यवम् महे क्षत्राय जिन्वथः ॥

8.022.07 Rich in food, As'vins, come to us by the paths of sacrifice, those by which showerers (of benefits), you went to gratify Tr.ks.i, the son of Trasadasyu, with vast wealth. [Alt. trans. (Griffith): COme to us, Lords of ample wealth, by paths of everlasting Law; Whereby to high dominion y with mighty strength raised Tr.ks.i, Trasadayu's son].

Us'anas gives the thunderbolt weapon to Indra, according to r.ca RV 1.121.12 [Note: the Bhr.gu are makers of Indra's chariot: RV 4.16.20].

एवेद् इन्द्राय वृषभाय वृष्णे ब्रह्माकर्म भृगवो न रथम् ।
नू चिद् यथा नः सख्या वियोषद् असन् न उग्रो ऽविता तनूपाः ॥

4.016.20 Therefore we offer to the vigorous Indra, the showerer (of benefits), holy adoration, that he may never withdraw his friendly (actions) from us, and that he may be our powerful protector, the defender of (our) persons, as the Bhr.gus (fabricate) a car (for use). [Bhr.gavo na ratham: bhr.gavo = di_ptas taks.a_n.ah, bright or dexterous carpenters; i.e. as a wheelwright makes a chariot for a special purpose, so the worshipper performs worship in order to secure Indra's favour].

Kutsa is Indra's charioteer (RV 2.19.6; 6.20.5); Nighan.t.u (2.20) has kutsa as a synonym of vajra (thunderbolt).

स रन्धयत् सदिवः सारथये शुष्णम् अशुषं कुयवं कुत्साय ।
दिवोदासाय नवतिं च नवेन्द्रः पुरो व्य् आरच् छम्बरस्य ॥

2.019.06 The radiant Indra subjected to Kutsa, his charioteer, (the asuras), S'us.n.a, As'us.a, and Kuyava; and, for the sake of Divoda_sa, demolished the ninety and nine cities of S'ambara. [As'us.a, he who is not to be dried up; perhaps, an epithet of S'us.n.a, an asura].

त्वम् इन्द्र नर्यो याँ अवो नॄन् तिष्ठा वातस्य सुयुजो वहिष्ठान् ।
यं ते काव्य उशना मन्दिनं दाद् वृत्रहणम् पार्यं ततक्ष वज्रम् ॥

1.121.12 Indra, friend of man, mount the horses whom you cherish, who are fleet as the wind, are easily yoked, and who bear (theri burden) well; you have sharpened the foe-destroying thunderbolt, the slayer of Vr.tra, which inspiring (weapon) Us'anas, the son of Kavi, gave you. [Which inspiring weapon: The weapon was the gift of R.bhu;and is also attributed to Us'anas].

तक्षद् यत् त उशना सहसा सहो वि रोदसी मज्मना बाधते शवः ।
आ त्वा वातस्य नृमणो मनोयुज आ पूयमाणम् अवहन्न् अभि श्रवः ॥

1.051.10 (R.s.i is Savya A_n:girasa) If Us.ana_s should sharpen your vigour by his own, then would your might terrify by its intensity both heaven and earth. Friend of man, let the will harnessed steeds, with the velocity of the wind, convey you, replete (with vigour), to (partake of the sacrificial) food.

अव स्य शूराध्वनो नान्तेऽस्मिन् नो अद्य सवने मन्दध्यै ।
शंसात्य् उक्थम् उशनेव वेधाश् चिकितुषे असुर्याय मन्म ॥

4.016.02 Hero, Indra, set us free today to give you exhilaration at this sacrifice, as (they let loose a horse) at the end of the road; may the worshipper, like Us'ana_s, repeat an acceptable prayer to you, the knower (of all things), the destroyer of the asuras.

त्वं कुत्सं शुष्णहत्येष्व् आविथारन्धयो ऽतिथिग्वाय शम्बरम् ।
महान्तं चिद् अर्बुदं नि क्रमीः पदा सनाद् एव दस्युहत्याय जज्ञिषे ॥

1.051.06 You have defended Kutsa in fatal fights with S'us'na; you have destroyed S'ambara in defence of Atithigva; you have trodden with your foot upon the great Arbuda; frm remote times were you born for the destruction of oppressors. [S'us'na, S'ambara and Arbuda are asuras. Kutsa is a r.s.i; Atithigva = hospitable, Divoda_sa].

त्वम् आयसम् प्रति वर्तयो गोर् दिवो अश्मानम् उपनीतम् ऋभ्वा ।
कुत्साय यत्र पुरुहूत वन्वञ् छुष्णम् अनन्तैः परियासि वधैः ॥

1.121.09 You did hurl your metal bolt upon the quick-moving (asura), the swift destroyer of foes, that was brought (to you) by R.bhu from heaven; when you, who are worshipped by many, striking S'us.n.a, for the sake of Kutsa, did encompass him with numberless fatal (weapons). [Brought by R.bhu from heaven: divo a_ni_tam R.bhva_; R.bhu = Tvas.t.a_, fabricator of Indra's thunderbolt. S'us.n.a = drought; Indra removes drought for the benefit of his worshippers,by many drops of rain].

उशना यत् सहस्यार् अयातं गृहम् इन्द्र जूजुवानेभिर् अश्वैः।

वन्वानो अत्र सरं ययाथ कुत्सेन देवैर् अवनोर् ह शुष्णम् ॥

5.029.09 (R.s.i: Gaurivi_ti S'a_ktya) When, Indra, you and Us'anas, with vigorous and rapid courses went to the dwelling of Kutsa, then destroying his foes, you went in one chariot with Kutsa and the gods, and verily you have slain S'us.n.a.

आ दस्युघ्ना मनसा याह्य् अस्तम् भुवत् ते कुत्सः सख्ये निकामः।

स्वे योनौ नि षदतं सरूपा वि वां चिकित्सद् ऋतचिद् ध नारी ॥

यासि कुत्सेन सरथम् अवस्युस् तोदो वातस्य हर्योर् ईशानः।

ऋज्रा वाजं न गध्यं युयूषन् कविर् यद् अहन् पार्याय भूषात् ॥

कुत्साय शुष्णम् अशुषं नि बर्हीः प्रपित्वे अह्नः कुयवं सहस्रा। सद्यो दस्यून् प्र मृण कुत्स्येन प्र सूरश् चक्रं वृहताद् अभीके ॥

4.016.10 (R.s.i: Va_madeva Gautama) With a mind resolved on killing the Dasyu, you came (to his dwelling), and Kutsa was

eager for your friendship; now have you two alighted in his, (Indra's), habitation, and being entirely similar in form the truthful woman has been perplexed (to discriminate between you). [Kutsa: a ra_jar.s.i, the son of Ruru, also a royal saint; Kutsa is the author of several su_ktas (RV 1.010), termed as the son of An:giras; there is also a legendary Kutsa, son of Arjuna; truthful woman has been perplexed: after destroying the enemies of Kutsa, Indra conveyed him to his palace, where S'aci, the wife of Indra, could not tell who her husband was, since both were exactly alike].
4.016.11 You go with Kutsa in the same chariot, determined to defend him; (you) who are the tormentor (of foes), the lord of horses (of the speech) of the wind; on the same day wherein, yoking (to the car) the straight-going steeds, as if to receive food, the sage (Kutsa) has been enabled to cross over (the sea) of calamity.
4.016.12 For Kutsa, you have slain the unhappy S'us.n.a and in the forepart of the day, attended by thousands (you have slain) Kuyava with the thunderbolt; you have swiftly destroyed the Dasyus, and you have cut them to pieces in the battle, with the wheel (of the chariot of) the sun.

महो द्रुहो अप विश्वायु धायि वज्रस्य यत् पतने पादि शुष्णः ।

उरु ष सरं सारथये कर् इन्द्रः कुत्साय सूर्यस्य सातौ ॥

6.020.05 When S'us.n.a passed away upon the falling of the thunderbolt, then the universal strength of the great oppressor was annihilated, and Indra enlarged their common car for (the use of) his charioteer Kutsa, for (the sake of) the worship of the sn. [su_ryasya sa_tau bha_hane nimittabhu_te; uru s.a saratham kar = sama_nuratham vistirn.am akarot; Kuts is the reputed author of the hymns to Su_rya and Us.as: RV. 1.113 and 115].

त्वम् अपो यदवे तुर्वशायारमयः सुदुघाः पार इन्द्र ।
उग्रम् अयातम् अवहो ह कुत्सं सं ह यद् वाम् उशनारन्त
देवाः ॥

5.031.08 (R.s.i: Avasyu A_treya) You, Indra, (abiding on the further bank), have rendered the fertilizing waters agreeable to Yadu and Turvas'u; you two, (Indra and Kutsa), have assailed the fierce (S'us.n.a), and (having slain him), you have conveyed Kutsa (to his dwelling), and Us'ana_s and the gods have therefore honoured you both.

त्वं वृध इन्द्र पूर्व्यो भूर वरिवस्यन्न् उशने काव्याय ।
परा नववास्त्वम् अनुदेयम् महे पित्रे ददाथ स्वं नपातम् ॥

6.020.11 (R.s.i: Bharadva_ja Ba_rhaspatya) Desirous of opulence, you, Indra, have been an ancient benefactor of Us'anas, the son of Kavi; having slain Navava_stva, you have given back his own grandson, who was (fit) to be restored to the grandfather.

युवं कवी ष्ठः पर्य् अश्विना रथं विशो न कुत्सो जरितुर्
नशायथः ।
युवोर् ह मक्षा पर्य् अश्विना मध्व् आसा भरत निष्कृतं न
योषणा ॥

10.040.06 Sage As'vins, stand by your chariot; make it approach (the sacrifice) of the worshipper, as Kutsa (made his chariot approach) men, the fly carries your honey, As'vins, in its mouth as a woman carries purified (honey). [As Kutsa...men: Kutsa

and Indra ride in the same chariot; cf. RV 4.16.11; as a woman: cf. RV 1.119.2].

युवं ह भुज्युं युवम् अश्विना वशं युवं शिञ्जारम् उशनाम् उपारथुः ।
युवो ररावा परि सख्यम् आसते युवोर् अहम् अवसा सुम्नम् आ चके ॥

10.040.07 You came, As'vins, to the rescue of Bhujyu, you came to the rescue of Vas'a, you came to S'in~ja_ra to (hear) his desirable (praise); the offerer of oblations besieges your friendship; and I desire happiness through your protection. [S'in~ja_ra: cf. RV 8.5.25; S'in~ja_ra was an Atri; As'vins came to rescue him from a fire-pit].

> This r.ca may also refer to Us'anas and the association with the fire-pit is notable, in the context of 'kavi' as a 'smith'.

अहम् अत्कं कवये शिश्नथं हथैर् अहं कुत्सम् आवम् आभिर् ऊतिभिः ।
अहं शुष्णस्य श्नथिता वधर् यमं न यो रर आर्यं नाम दस्यवे ॥

10.049.03(R.s.i: Indra Vaikun.t.ha) I smote Atka with many weapons for the defence of the sage; with those protections I preserved Kutsa; I am the slayer of S'us.n.a; I grasped the thunderbolt I who have not given the water (na_ma) of the A_ryas to the Dasyu.

स व्राधतः शवसानेभिर् अस्य कुत्साय शुष्णं कृपणे परादात्।
अयं कविम् अनयच् छस्यमानम् अत्कं यो अस्य सनितोत नृणाम्॥

10.099.09 Let him overthrow the mighty with powerful (weapons); he destroyed S'us.n.a for the sake of the liberal Kutsa; he humiliated Kavi, who praised him, who was the giver of form to Indra and his men. [Kutsa: kutsa_ya s'us.n.amas'us.am ni barhi_h : RV 4.16.12; let him overthrow: asya = his, s'avasa_nebhih; or, asyatu, let him throw; Kavi = Us'ana_, the son of Kavi].

Ga_tha_s of Avestan are contemporaneous with the Pura_n.as of the Vedic tradition in Bharat.

Let us start with some excerpts from Arthur Christensen, 1932, *Les Kayanides*. Det Kgl. Danske Videnskabernes Sellskab, Hist.-Filos. Meddelelser XIX.2. Copenhagen (accents are affixed):

"Kayanides et Achemenides. Exposition des problemes. Le fait que Vis.ta_spa, le protecteu royal de Zoroastre, dont l'existence historique est assure'e par les Ga_tha_s, porte le me^me nom que le pe`re de Darius I, a porte' quelques savants a` croir qu'il s'agit la` d'un meme peronnage, et on a cherche a prouver leur identite' par de arguments diffe'rents...A l'avis de M. Hertel (Achaemeniden und Kayaniden, p.55), la se'rie des Kavis anciens (la s'erie qui commence par Kava_ta et finit par Haosravah) repre'sente possiblement des chefs de tribu est-iraniens, historiques on le'gendaires...Mais l'essentiel, pour M. Herzfeld comme pour M. Hertel, est l'identite' de Kavi Vis.ta_spa avec Vis.ta_spa l'Achemenide, satrape de Parthava...C'est a` ce Vis.ta_spa que s'addressai le prophe`te Zoroastre, venant de Raga, qui e'tait son pays natal... (pp. 1-4)

"M. Herzfeld s'exprime en ces termesk-ci (Modi Memorial Volume, p. 199): "Our explanation becomes a fact, established beyond any possible doubt, by another observation hitherto left aside: the region, so minutely described in the Yashts, is the land from which, at the Last Day, the So_shyans will appear. Now, to expect the coming of the Saviour from a distant place, implies that the same place, Sistan, was considered to have been the original place of the teaching of the prophet..." (p.5)

"Ces premiers rois et he'ros le'gendaires, dont l'histoire est caracte'rise'e par des mythes indo-iraniens, sont suivis par les rois a` titre de kavi, place's dans le me^me ordre dans le Yas.ts 13 (132) et 19 (71 sqq.), a` savoir: Kavi Kava_ta, Kavi Aipivohu, Kavi Usadan, Kavi Ars.an, Kavi Pisinah, Kavi Byars.an, Kavi Sya_vars.an et Kavi Haosravah (Husraavah). Avec ce dernier finit la se'rie des rois pre'=zoroastriens. Kavi VIs.ta_spa, qui est nomme' se'pare'ment, au dehors de la se'rie des huit kavis pre'ce'dents, est le dernier des anciens rois mentionne's dans l'Avesta re'cen... Le fravas.i de Kavi Haosravah est invoque'e "pour re'sister aux sorciers et aux sorcie`res, aux kavis et aux karpans tyranniques et aux maux cause's par les tyrans" (Yt. 13.133-135)...(pp.18-19)

"Le passage du Bundahis.n que nous venons de citer, e'nume`re trois fils de Spandya_d: Vahman, A_durtarsah (Ataro_tarsah) et Mihrtarsah (MItro_tarsah)...Ardas.i_r Pa_baga_n, le fondateur de la dynastie sassanide, e'tait un descendant direct de ce Vahman. L'identifications de Vahman-Ardas.i_r avec l'Acheme'nide Artaxerxe I date probablement des temps post-sassnides..." (p. 98).

"Dans l'Avesta, Keresa_spa es le he'ros d'innombrables aventures. Il est le fils d Trita de la famille des Sa_mas, un homme aux cheveux boucle's, arme' d'une massue, le plus fort parmi les hommes, le fre`re du le'gislateur fameux Urva_xs.aya... Selon le Vendi_da_d (1.9) Keresa_spa se laissa se'duire par la sorcie`re Xna_vaiti_, qui hantait le pays de Vae_kereta (Kaboulistan). Son corps (immortel) est garde' par

99,999 fravas.is (Yt. 13.61). E'videmment, le Keresa_spa de l'Avesta est un ancien tueur de dragons et he'ros de conte populaire, dont les exploits fabuleux ont rec,u, tant bien que mal, une interpre'tation religieuse...(pp.99-100)

"Les Yas.ts e'tablissent un certain rapport entre Yima et Keresa_spa. La Gloire, le xvarenah, abandonna Yima par trois fois ou pluto^t en trois portions, dont la premie`re fut saisie par le dieu Mitra, la deuxie`me par Trae_taona et la troisie`me par Keresa_spa (Yt. 1.30-38). La distribution des deux dernie`res portions entre les deux he'ros est conforme a` la logique de la le'gende, car Trae_taona (Fre_do_n) est celui qui enchai^ne Azi Daha_ka, le meurtrier de Yima, et Keresa_spa le tuera au jour du jugement dernier. Le Y.9 place Keresa_spa entre Trae_taona et Zoroastre, le Yt.9 entre Trae_taona et Franrasyan, le Yt. 15 entre Trae_taona et Kavi Haosravah. Donc, il a partout sa place naturelle apre`s Trae_taona comme le second he'ritier de la Gloire de Yima (Le Yt. 13.130 sqq. a une autre succession des he'ros, sans Keresa_spa)...Apre`s Manus.civra on a place' la pe'riode d'oppression sous Franrasyan et la restitutuion avec le re`gne d'Uzava..." (pp. 103-104).

"De quelques noms emprunte's aux arbres ge'ne'alogiques de Fra_nag (?) et de Lo_hra_sp on a compose' le tableau suivant des ance^tres de Kay Kava_d (T.abari_, p. 533; Fa_Rsna_mah, ex. Le Strange et Nicholson, p. 14):

"Manus.cihr -- No_dar -- Manus. -- No_dara_n, No_daragan -- Rag -- Kay Kava_d, marie' avec Fra_nag, fille du chef turkestanien Vitirisa_ (Bidirisa_, T.ab.)... (p.107).

"Sur la ge'ne'alogie de Kars.a_sp il existe deux versions: (A) Fre_do_n -- Tu_c -- Du_ro_s.a_sp -- Spae_nya_sp -- Tu_rag -- Nari_ma_n -- Sa_m -- Atrit -- Kars.a_sp. (B) Manus.cihr -- Du_ro_srav -- Racan -- Narse_ - As.k -- Tahma_sp -- Nari_man -- Kars.a_sp... (p. 130).

"EXCURSUS. Les immortels d'apre`s les sources pehlvies. Su_dgar Nask (De_nkard 9.16.12; 9.15.11 de l'e'd. de Peshotan): Les septs souverains immortels du Xvani_Ras: Van e_ yud-be_s. dans l'Era_n-ve_J; Go_pad(s.a_h) en Ane_ran; Pis.iyo_tan a` Kangde_z; Frada_xs.t e_ Xumbi_g dans le eaux des canaux; As.avazd, fils de Po_rudaxs.t dans la plaine de Pe_s.anse_; Barazd, qui provoque le combat; Kay Xusrav; Su_dgar Nask (commentaire Pehlvi); De_nkard 9.23; 9.22 de l'e'd. de Peshotan): Haois., fils de Geurva; To_s; Kay Abive_h; Kay Xusrav; Kars.a_sp. (p. 153).

Tradition of Bha_rat: Kavi Us'anas in Pratis.t.ha_na

As in Iran, so in India, all royal lineages are traced to Manu (Vaivasvata). Cognate names are: Manus.cihr (Manu Vaivasvata), Du_ro_srav (Dhr.s.t.a), Na_ri_man (Naris.yanta), Atrit (Sarya_ti), Racan (Rambha), As.k (S'ivi Aus'ina_ra), Kars.a_sp (Karu_s.a).

Amont the r.s.is, the chronology of the Bha_rgavas is: Cyavana, Us'anas-s'ukra (called a kavi or kavi's son or Ka_vya), s'an.d.a and marka (apnava_na), u_rva. Us'anas-S'ukra is associated with the Daityas, Da_navas and Asuras (Pargiter, p. 194). S'ukra's wife was the pitr.-kanya_ Go, and they had four sons: Tvas.t.r, Varu_trin, S'an.d.a (or S.an.d.a) and Marka. S'an.d.a and Marka were priests of the asuras according to Vedic literature (both are called asura-raks.as, S'atapatha Bra_hman.a 4,2.1,4-6). Were Ma_rkan.d.eyas descended from Marka? In the Yajus, the As'vins drink before S'an.d.a and Marka. (TS 1.4.7-9; S'Br 4.1.5; 2.1; KS'S 9.9.20 ff; Yajn~es'varas'arman, *A_ryavidya_sudha_kara*, p. 86).

"Cyavana is always connected with the west of India, the country around the GUlf of Cambay, in or near S'arya_ti's territory Anarta (Gujarat) as shown by the story of his marrying Sukanya_, and by the statement that he performed austerities near the Vaidu_rya Mts (The west portion of the Satpura range) and the River Narmada_. Us'anas-S'ukra is connected rather with the central region of N. India, for Yaya_ti king of Pratis.t.ha_na (ALlahabad) met his daughter Devaya_ni_ near his own territory and married her; and Kapa_lamocana on the Sarasvati_ is called his ti_rtha...It seems probable that Ma_rkan.d.a is to be connected with Marka, son of Us'anas-S'ukra..." (pp. 196-197, 203).

"The kings were all ma_nvas, and the rishis were connected with the Ma_nvas or with Daityas and Da_navas. Only one hymn is ascribed to an early Aila, viz. x.95 to Puru_ravas...Not a single other hymn is attributed to an early Aila king until S'ivi Aus'i_nara (x,179) and Ga_thi or Ga_dhi (iii,19 to 22)...THose Ma_nva kings all reigned at Ayodhya_ or in the Vais'a_li_ realm, that is, in the eastern region, except S'arya_ta who was in the west. No hymns are assigned to anyone who lived in the north-west until S"ivi. These facts supply ground for the declaration that the Vedas were first chanted in the eastern region -- not in the north-west...They rather suggest that the making of hymns passed with the above describd approximation of the brahmans to the Ailas; and it is probable that the Aila Vis'va_mitra on becoming a brahman modified the older and perhaps cruder brahmanic character and functions; and, if so, the difference would have accentuated the hostility that Vasis.t.ha (who was a Ma_nva brahman) showed to his brahmanhood." (pp. 312-313).

Us'anas is 26 in the genealogy list of ya__dava royalty: manu, ila_, puru_ravas, ayu, nahus.a, yaya_ti, yadu, kros.t.u, vr.jini_vant, sva_hi, rus'adgu, citraratha, s'as'abindu, pr.thus'ravas, antara, suyajn~a and then Us'anas. (p. 144)

"Tradition naturally begins with myth, and he myth that seeks to explain the earliest conditions in India derives all the dynasties that reigned there (not the populace) from a primaeval king Manu Vaivasvata, son of Vivasvant (the sun)...It is narrated in three forms, of which the second and third have more in common than the first. According to the first, (Matsya 11,40 to 12,19; Padma 5,8,75-124), Manu had ten sons of whom the eldest was Ila, and Ila while on conquest entered S'iva's grove S'aravana and became changed into a woman, Ila_, because Uma_ had laid a curse that any male creature which entered it should become female. Ila_ consorted with Budha, son of Soma, and Ila had by him a son Puru_ravas Aila. Then through S"iva's favour Ila_ became a Kimpurus.a named Sudyumna, a man one month and a woman another month. According to the second form (Va_yu 85. Bd. 3,60), Manu had nine sons and offered a sacrifice to Mitra and Varun.a to obtain a son, but a daughter Ila_ was born thereform. She met Budha and bore Puru_ravas. Then she became a man named Sudyumna but through the same curse regained manhod as Sudyumna. The third form (Vis.n.u 4,1,5-11; Ma_rk 111; Bha_g 9,1,11-40) agrees generally in this version, but places the transformation into manhood and back again into womanhood before she met Budha..." (Pargiter, pp. 253-254).

"The nine sons assigned to Manu were Iks.va_ku, Na_bha_ga (or Nr.ga), Dhr.s.t.a, S'arya_ti, Naris.yanta, Pra_m.s'u, Na_bha_nedis.t.ha, Karu_s.a and Pr.s.adhra. From Karu_s.a were descended the numerous ks.atriya clans of the Ka_ru_s.as, ho were determined fighters. They occupied the Karu_s.a counry, the region round the modern Rewa and eastwards to the River Sone. From Dhr.s.t.a came a number of clans called Dh_rs.t.akas, who were reckoned ks.atriyas. Nothing further is said about them except that the S"iva says they occupied the Balhi_ka country, which may mean Balkh, but was more probably the Va_Hli_ka country in the PUnjab. About Naris.yanta's offspring there is much confusion. SOme Puranas say they were the S'akas. If so, they lay outside India. The late Bha_gavata gives a list of his descendants, and says they developed ito the Agnives'ya_yana brahmans; but this, if true, more probably refers to Naris.yanta, king of the Vais'a_la dynasty. Pr.s.adhra, it is said became a s'u_dra, because he killed his guru's cow and was cursed: and two Puranas say the gur was Cyavana. Na_bha_ga and his son Ambari_s.a probably reigned on the River Jumna...Na_bha_nedis.t.ha's line reigned in the country of Vais'a_li_; and S'arya_ti, who is called S'arya_ta in brahmanical books, founded the dynasty of A_narta... (pp. 256-257).

"The most exhaustive study ... by Arthur Christensen in his book on the Kayanian dynasty of Iran (Christensen, A.,1932, *Les Kayanides*. Det Kgl. Danske Videnskabernes Sellskab, Hist.-Filos. Meddelelser XIX.2. Copenhagen). In it he argued that the rulers who are styled Kauui in the Avesta (Kauui Kauua_ta, etc.) were most probably historical figures, in contrast to those preceding them, who did not carry this title and were probably just mythological figures (Yima, Trae_taona, etc.). That the latter group is comprised of mythological figures is easily proved by the fact that they are common to both the old Indians and the old Iranians and therefore must have belonged to the pre-Iranian traditions of the Indo-Iranians. Therefore, they clearly cannot belong to the early history of the Iranians after their separation from the Indians...**the list of Kauuis also contains at least one figure that is also found in Indian tradition, as shown by Lommel and Dumezil, namely Kauuui Usan/Usad.an, who both by name and by the legends associated with him corresponds to Ka_vya Us'anas of Indian tradition**. There is therefore every reason to conclude that the list of Kauuis also contains only mythological figures (Kellens, J., 1979, L'Avesta Comme source historique: La liste des Kayanides. In *Studies in the Sources on the History of Pre-Islamic Central Asia*, ed. by J. Harmatta, 41-53. Budapest, Akademiai Kiado). As for

the title kauui itself, although in the later Zoroastrian tradition it designates political rulers, there is no evidence in the Avesta that it is used other than as a designation of a special kind of priest. **In the Gathas it is closely related to terms such as karapan and usij, both designate special kinds of priests, and its Indian relative kavi has nothing to do with political power, but designates the poet priest**. The kauuis listed in the yashts are also not described as rulers, for which Avestan has a series of very specific terms consisting of a word for territory plus paiti 'lord'. When kauui is not used as a title it is commonly found in lists of opponents of the Zoroastrian religion, a notion inherited from the Gathas, where the kauuis are portrayed as opponents of Zarathustra, with the exception of Kauui Vis.ta_spa, who supported him. Nevertheless, the Gathis Kauui Vis.ta_spa is commonly portrayed in Western scholarly literature as the royal patron of Zarathustra, primarily no doubt, through the influence of the later Zoroastrian tradition, (in which Vis.ta_spa is a king, who, together with his minister, Ja_ma_sp, goes to battle against Arza_sp in the defense of the new faith), but partly also through the interpretation of some Avestan passages. Thus, in Yt 5.68, Ja_ma_spa is said to have sacrificed to Ana_hita_ as he confronted an army of liars and dae_ua worshippers, and in passages of Yt. 19 Kauui Vis.ta_spa is said to have fought for the good religion. The Avestan passages provide no basis for any interpretation of Kauui VIs.ta_spa's position other than as a supporter of the faith (Kellns, J., 1979, L'Avesta comme source historique: La liste des Kayanides. In *Studies in the Sources on the History of pre-Islamic Central Asia*, ed. J. Harmatta, Budapest, Akademiai Kiado, p. 51)...Note also the name R.tacanah 'loving R.ta' in the Elamite and Aramaic documents from Persepolis. THe Persepolis texts contain numerous deities and theophoric names (Mazdada_Ta, Mitrapa_ta, Bagapa_ta, etc.) which show that Avestan deities other than Ahuramazda_, as well as non-Avestan deities, were worshipped (or at least known) in southwestern IRan under Darius and Xerxes. Artaxerxes II (405/6-359/8) in his inscriptions called upon Mitra and Ana_hita_ besides Ahuramazda_ to protect him and his work, and the Aramaic letters from Elephantine written in that period contain such peronal names of Avestan background as A_rmati_da_Ta 'given by A_rmati_'. From about 490 BC we find the Avestan calendar in use in Cappadocia, one of the western provinces of the Achaemenid empire (Duchesne-Guillemin, J., 1962, *La religion de l'Iran ancien*. Paris, PResses Universitaires de France, p. 121). It soon replaced the old Persian 'farmer's' calendar everywhere." (P. Oktor Skjaervo, 1995, The Avesta as source for the early history of the Iranians, in: George Erdosy, ed., *The Indo-Aryans of Ancient South Asia*, Berlin, Walter de Gruyter and Co.)

Like the Vedas, Avesta was also transmitted orally. The old Avestan texts of yas.ts were transmitted with a fidelity comparable to the transmission of the R.gveda.

Humbach suggests the date to 1080 BC for Zarathustra, primarily based on the classical Greek sources (which were earlier used to date Zarathustra to ca. 600 BC). (Humbach.H., et al., 1991, *The Ga_tha_s of Zarathustra and the other Old Avestan texts*. 2 vols., Heidelberg, Carl Winter Universitatsverlag, pp. 24-27). Humbach's conclusions are: (p. 23):

> "It must be emphasised that th process of polarisation of relations between the Ahuras and the Dae_vas is already complete in the Ga_tha_s, whereas, in the Rigveda, the reverse process of polarisation between the Devas and the Asuras, which does not begin before the later parts of the RIgveda, develops as it were before our very eyes, and is not completed until the later Vedic period. THus, it is not all likely that the origins of the polarisation are to be sought in the prehistorical, the Proto-Aryan period. More likely, Zarathushtra's reform was the result of independent developments, when Irano-Indian contacts still persisted at the dawn of history. With their Ahura-Dae_va ideology, the Mazdayasnians, guided by their prophet, deliberately dissociated themselves from the Deva-Asura concept which was being developed, or had been developed, in India, and probably also in the adjacent Iranian-speaking countries...All this suggests a synchrony between the later Vedic period and Zarathushtra's reform in Iran."

The corpus of the Rigveda is emphatic proof of the settlement of Proto-Aryan Deva and Asura in the region around Kuruks.etra and upto Parus.n.i_ river. The evolution of the Avestan Ahura is apparently relatable to this locus of Northwest India, between the Rivers Sarasvati_ and Parus.n.i_.

It is, therefore, reasonable to surmise that as the Avestan tradition moved into the hinterland of Iran, the memories of life together were retained and a tributary of Helmand was called Haraqvaiti, in memory of the River Sarasvati_ of Northwest

India. The Kavi who were left in India continued the Vedic tradition into the Bra_hman.a; the Kavi who moved into Iran continued the 'smithy' tradition and became chieftains. Zarathushtra's followers who were opposed to the 'kavi' remembered the Vedic Soma as Haoma and embellished it as a process of purification of a plant. The Rasa_ (evoking Soma rasa or potable gold-silver, electrum) became a mythical border river which separated the two peoples of Iran and India.

> That clave unto Kavi Kavata, and unto Kavi Aipivohu, and unto Kavi Usadha, and unto Kavi Arshan, and unto Kavi Pisina, and unto Kavi Byarshan, and unto Kavi Syavarshan (Zamya_d Yasht 19.71).
>
> He carries the chariot of the lords; he carries the chariots of the lordly ones, the chariots of the sovereigns. He carried the chariot of Kavi Usa; upon his wings runs the male horse, runs the burden-bearing camel, runs the water of the river. (Warharan (or Bahra_m) Yasht 14.39)
>
> 'Offer up a sacrifice, O Spitama Zarathushtra! unto this spring of mine, Ardvi Sura Anahita.... 'To her did the great, most wise Kavi Usa offer up a sacrifice from Mount Erezifya, with a hundred male horses, a thousand oxen, ten thousand lambs. [A_ba_n (or Aban, Hymn to the Waters) Yasht 5.45]
>
> We worship the Fravashi of the holy Spiti, the son of Uspasnu;
> We worship the Fravashi of the holy Erezraspa, the son of Uspasnu.
> We worship the Fravashi of the holy Usadhan, the son of Mazdayasna.
> We worship the Fravashi of the holy Fradat-vanghu, the son of Stivant.

> We worship the Fravashi of the holy Raochas-chaeshman;
> We worship the Fravashi of the holy Hvare-chaeshman
> We worship the Fravashi of the holy Frasrutara;
> We worship the Fravashi of the holy Visrutara.
> [Frawardin (or Farvardi_n Yasht ("Hymn to the Guardian Angels") 13.121]

These Avestan texts refer to Kavi Usan (or Us'ana_), Kavi Kava_ta (later identified with Kaikoba_d) and Kavi Usadhan (later identified with Kaikaus). In the tradition of Zarathushtra, the Kavis are condemned perhaps as a group who had joined the enemies. Perhaps, there is an intimation of the increasing animosity between the kavis who are smiths (who later become chieftains) and kavis who are priests. Zarathushtra refers to the Us'ij (Aus'ija) identifying them with Karapan (Y 44.20), a term used for enemy priests. He also refers to grahma as the persistent enemies (Y 32.12-14). It is unclear if this is concordant with gra_ma in RV 3.33.11 (which refers to the troops of Bharata).

The Anu king who is (Anu are identified with the Parus.n.i_ river) called Kavi Ca_yama_na (RV 7.18.8) fights against Suda_s (RV 7.18.12). Another Ca_yama_na is referred to as Abhya_vartin Ca_yama_na, a descendant of Pr.thu (RV 6.27.8):

द्वयाँ अग्ने रथिनो विंशतिं गा वधूमतो मघवा मह्यं सम्राट् ।
अभ्यावर्ती चायमानो ददाति दूणाशेयं दक्षिणा पार्थवानाम् ॥

6.027.08 The opulent supreme sovereign Abhya_vartin, the son of Ca_yama_na, presents, Agni, to me two damsels riding in cars, and twenty cows; this donation of the descendant of Pr.thu cannot be desroyed. [Two damsels: dvaya_n rathino vim.s'ati ga_ vadhu_mantah = rathasahita_n vadhu_matah stri_yukta_n dvaya_n mithunabhu_ta_n, being in pairs, having women together with cars; twenty animals, pas'u_n; perhaps, the gift comprised of twenty pairs of oxen yoked two and two in chariots; the gift of females to saintly persons; this donation: du_n.a_s'eyam daks.in.a_ pa_rthava_na_m =

na_s'ayitum as'akya_; pa_rthava: Abhya_vartin, as descended from Pr.thu, the plural is used honorifically].

अध श्रुतं कवषं वृद्धम् अप्स्व् अनु द्रुह्युं नि वृणग् वज्रबाहुः ।
वृणाना अत्र सख्याय सख्यं त्वायन्तो ये अमदन्न् अनु त्वा ॥

7.018.12 You, the bearer of the thunderbolt, did drown S'ruta, Kavas.a, Vr.ddha and afterwards Druhyu, in the waters; for they, Indra, who are devoted to you, and glorify you, preferring your friendship, enjoy it.

दुराध्यो अदितिं स्रेवयन्तो ऽचेतसो वि जगृभ्रे परुष्णीम् ।
मह्नाविव्यक् पृथिवीम् पत्यमानः पशुष् कविर् अशयच् चायमानः ॥

7.018.08 The evil-disposed and stupid (enemies of Suda_sa), crossing the humble Parus.n.i river, have broken down its banks; but he by his greatness pervades the earth, and Kavi, the son of Ca_yamana, like a falling victim, sleeps (in death). [Sleeps in death: killed Suda_sa].

Avestan in mid-3rd and 2nd millennia BC

Zend - Avesta is divided into 5 parts:

Yasna liturgical book of the Parsees
Vispered the lesser liturgy
Vendidad priestly code of the Parsees
Yashts hymn book
Khordah prayer book

"...Old Avestan has all the phonetic characteristics typical of Iranian languages -- e.g. Iranian h = Indian s (Ind. asura, Ir. ahura), spirantisation of stops before consonant including the Indo-Iranian laryngeal H (Ind. satya, Av. haitiia, OPers. Has.iya; Ind. pathah, Av. pato_)...A few geographical names appear to

be inherited from Indo-Iranian times. For instance, OPers. Haraiva-, Av. (acc.) Haro_iium and Opers. Harauvati_, Av. Haraxvaiti_, both of which in historical times are located in the area of southern Afghanistan (Herat and Kandahar), corresponding to the two Vedic river names Sarayu- and Sarasvati_. These correspondences are interesting, but tell us nothing about the early geography of the Indi-Iranian tribes...The river Hae_tumant, which flows into the Kasaoiia sea, corresponds to the modern Helmand in Sistan, which flows westward into Lake Hamun...Archaeological excavations by the Italian Mission at S.ahr-e Suxta (Tosi, ed., 1984, *Prehistoric Si_sta_n*, Rome, IsMEO) in the Helmand delta have shown that in the mid-3rd millennium it 'was apparently the largest settlement on the eastern Iranian plateau' (Dyson, R.H. and Voigt, M.M., 1989, Bronze Age. In *Encyclopaedia Iranica* vol. IV.5 ed. by E. Yarshater, London and New York, Routledge and Kegan Paul, p. 470). When the site was gradually abandoned toward the end of the Bronze Age, numerous villages in the surroundings remained (Ibid, 477), indicating that settlement continued int the 'Avestan period'...In the Vide_vda_d...(Raga_) is listed between the Helmand river and Caxra (assumed to be modern Carx near Ghazna in south-east Afghanistan)...Lake Cae_cas.ta, on the shore of which Kauui Haosrauuah sacrificed (Yt. 5.49) is identified in the later tradition with Urmia sea in Azerbaijan, western Iran, but again the Avesta itself contains no evidence for such a location...'early date' for the older Avesta would be the 14th-11th centuries BC, close to the middle of the second millennium (similarly Boyce, 1992, *Zoroastrianism. Its Antiquity and Constant Vigour*, Columbia Lectures on Iranian Studies, no.7, Costa Mesa, Calif. and New York, Mazda Publishers and Bibliotheca Persica, p. 44-45). This would then postdate the end of the Bactria-Margiana Archaeological Complex by at least 300 years...Chariots are mentioned in the Gathas (implicitly in rati_ 'charioteer', but these belong to the Indo-Iranian period, as they also feature prominently in the R.gveda...This society knew metals, notably aiia. The original meaning of this word may have been 'bronze', but its exact meaning in the Gathas cannot be determined. It should be noted, however, that the word for 'iron' in the Iranian languages is different: namely, *a_cwanya-, possibly derived from *a_cu-, 'pointed, sharp'...The fire played a crucial role, as in India, as the transmitter of the human sacrifice to the gods and the approval of the gods back to the humans...(P. Oktor Skjaervo, 1995, The Avesta as source for the early history of the Iranians, in: George Erdosy, ed., *The Indo-Aryans of Ancient South Asia*, Berlin, Walter de Gruyter and Co., pp. 161-163)

In Zoroaster's theology the Amesha Spentas, or Bountiful Immortals, were divine beings who acted essentially as agents of the power of Ahura Mazda; they were traditionally seven in number: Bounteous Spirit, Good Mind, Truth, Rightmindedness, Dominion, Health, and Life. The first of these, Spenta Mainyu, is of special importance in that he is paired with a "twin," Angra Mainyu, or Hostile Spirit.

During the 7th and 6th centuries BC the ancient polytheistic religion of the Iranians was reformed and given new dimensions by the prophet Zoroaster (or Zarathusthra). Zoroaster's life dates have been traditionally given as (c. 628 - 551 BC)

Zoroaster taught a higher moral plane, where men attained virtue by good thoughts and conduct rather than by sacrifice. All of a man's good works are actually entered into the book of life as credits, and bad works as debits. If the total score is positive, the soul goes to heaven; if negative, hell. If the balance is close, the soul stays in an intermediate state until the final judgment. Sins could never be washed away, but just balanced out.

Zoroastrianism is a religion that developed in Iran from about the sixth century BC, generally ascribed to Zoroaster (Zarathustra), who was born in Iran '258 years before Alexander.' The date of Zoroaster's birth has been given variously as 6000 BC, 1400 BC, and 1000 BC, but Herzfeld accepts the traditional date, approximately, as now confirmed (Herzfeld, (570 - 500 BC); Jackson, 660 - 583 BC). Accordingly, Zoroaster was contemporary with other great religious personages, including Buddha, Confucius, Lao Tze, and several Hebrew prophets. That Zoroaster used Vedic materials found in early Hinduism can hardly be denied; that he was a polytheist like Darius, Xerxes, and others who were probably Zoroastrians (at least, their inscriptions pay homage to Ahura Mazda) seems most likely.

But Zoroaster was protesting against the false and cruel in religion, and followed the principle, "If the gods do aught shameful, they are not gods." Accordingly, he exalted Ahura Mazda ("wise Lord," often improperly translated "Lord of light") as supreme among the gods or spirits, and viewed the world as an agelong struggle between Ahura Mazda and Angra Mainy (or Ahramanyus, Ahriman, "Spirit of evil"), both of whom came into existence

independently in the distant past. Zoroastrianism is therefore called a dualism, but it is a limited dualism.

Vivasvan, Yama, Trita

Let us review Avestan as a language representing the so-called Indo-Iranian or, more aptly the period when the kavis or r.s.is of the Avestan and R.gvedic tradition were together in Bharat; the younger Avestan texts and the Bra_hman.as may denote the periods when the Avestan and R.gvedic traditions evolved in parallel in eastern Iran and in Bharat respectively.

Homa Yas.t classifies the first Haoma pressers: Vi_vahvat, A_twya and Trita.

Vivasvan, the first, ancient sacrificer or presser of Soma (a_tma_ yajn~asya pu_rvyah: RV 9.2.10)

Vivahvant (or Av. Vi_Vahvat.) was the first to press Soma, followed by Yama who was his son. A_thwya pressed Soma as the third one. A_thwya's son was Thrae_taona. Urva_khs.aya and Keresa_spa were the sons of Thrita, the third Soma presser. Thrae_taona killed the three-headed Azi Daha_ka. Thrae_taona is called vi_so_ puthro_ a_thwya_no_is. vi_so_ su_raya in Yas.t V.33; IX.13; XV.23) and hence is interpreted as a clan name.Trita of the Vedic mythology killed vis'varu_pa tris'i_rs.an. (Hillebrandt, vol. 2, p. 195).

> Yama is the son of Vivasvat. In Avesta, Yima is xs.ae_ta or hvthawa, 'rich in herds'; Yima is the king of a kingdom in paradise, after he is robbed of his majesty because of a falsehood. 'The splendour deserts Yima thrice and is seized by Mithra, Thrae_taona, A_thwya and Keresa_spa'. (Hillebrandt, vol.2, p. 228). When Zarathus.tra asks Haoma as to who among the men pressed him at first, the latter replies: vi_vanha_ mam paoiryo_ masyo_ hunu_ta, and that as reward Yima was born as his son...R.V 7.33.-10: yamena tatam paridhim vayanto 'psarasa upa sedur vasis.t.ha_h yamena tatam pariddhim vayis.ya_nn apsarasah pari jajn~e vasis.t.hah -- according to which the Vasis.t.has weave the 'frame' or warp which has been stretched out by Yama, i.e., Yama has invented the sacrifice and the

Vasis.t.has now continue his work.' (Hillebrandt, vol.2, pp. 224, 227).

AV 18.3.13: **yo mam_ra prathamo martya_na_m**
yah preya_ya prathamo lokam etam
vaivasvata_m sam.gamanam
jana_na_m yamam ra_ja_am havis.a_ saparya

"Him who died first among the mortals, who went forth to this place, Vivasvat's son and assembler of people, king Yama, worship with Havis." (Hillebrandt, vol.2, p. 223).

Ludwig (III,333; , 392) explains Vivasvat of the AV as 'the bright sky beyond which Yama's realm is situated' (I, p.89: 'In fact the word vivasvat has become in later literature a name for the sun. I would even admit, if it comes to that, that he was called by this name from the earliest times. I would admit that the expression in RV 10.39.12: 'the two days (day and night) of Vivasvat', very naturally suggests that the sun is meant and in any case Vivasvat figures as a divine being in RV 10.65.6 along with Varun.a and the gods. It will still remain equally true that the conception of Agni, of whom the sun is only one of the forms, can alone account for the character of an ancient sacrificer, which is the dominant trait of Vivasvat in the R.V".)

The gods enjoy in the house of Vivasvat, who has Soma (RV 10.12.7); he Soma jar is obtained from Vivasvat by Indar (RV 8.72.8); Indra deposits his treasue with Vivasvat (RV 2.13.6):

यस्मि॑न् दे॒वा वि॒दथे॑ मा॒दय॑न्ते वि॒वस्व॑तः॒ सद॑ने धा॒रय॑न्ते ।
सूर्ये॒ ज्योति॒र् अद॑धुर् मा॒स्य् अ॒क्तून् परि॑ द्यो॒तनिं॒ च॑रतो॒ अज॑स्रा ॥

10.012.07 In him the gods find pleasure at the sacrifice; they seat themselves on the altar of the sacrificer (vivasvatah sadane). They placed light in the sun; beams in the moon; and these untiring shed their light around.

आ तेन॑ यातम् मन॑सो जवी॑यसा र॒ं यं वा॑म् ऋ॒भव॑श् च॒क्रुर् अ॑श्विना ।
यस्य॒ योगे॑ दुहि॒ता जाय॑ते दि॒व उ॒भे अह॑नी सुदिने॑ वि॒वस्व॑तः ॥

10.039.12 Come, As'vins, with the chariot that is swifter than thought, which the Ribhus made for you; in connection with which the daughter of heaven, (the dawn), is born and both the auspicious day and night from Vivasvat. [Is the reading 'sudine' or 'sadane' (at the fire-altar)? In RV 1.53.1, 3.34.7 and 51.3, the phrase is: vivasvatah sa_dane, the place where the singers (kavayah, ka_ruh, vipra_h) stood. In Sa_yan.a's commentary on RV 1.53.1 the rendering: paricarato yajama_nasya sadane yajn~agr.he; on 3.34.7: vis'es.en.agnihotra_dikarma_rthe vasato yajama_nasya sadane gr.he; on 3.51.3: manus.yasys yajama_nasya svabhu_te sadane vedya_khye stha_ne; similar notes on RV 10.75.1, 10.12.7. "Thus the Indian commentator explains in all passages Vivasvat as the sacrificer...we may state as a positive inference that here vivasvat is a name -- of course an honorific name -- for the sacrificer and that vivasvatah sa_dane has the same purport as da_s'us.o gr.he."(Hillebrandt, vol. 2, pp. 215-6). The word, 'sa_danam' is used in RV 10.135.7 referring to the dwelling of Yama:]

इ॒दं य॒मस्य॒ साद॑नं दे॒वमा॒नं यद् उ॒च्यते॑ ।
इ॒यम् अ॑स्य धम्यते ना॒ळीर् अ॒यं गी॒र्भिः परि॑ष्कृतः ॥

10.135.07 This is the dwelling of Yama, which is called the fabric of the gods; this pipe is sounded for his (gratification), he is propitiated by hymns. [The hymn may be to A_ditya and to Yama: Taittiri_ya Bra_hman.a 3.11.8; there is a dialogue between Naciketas and Yama in Kat.ha Upanis.ad on what becomes of the soul after death; the father of Naciketas is named: Audda_laki and A_run.i].

या गौर् व॑र्त॒निम् प॒र्येति॑ निष्कृ॒तम् पयो॒ दुहा॑ना व्रत॒नीर् अ॑वा॒रतः॑ ।
सा प्र॑ब्रुवा॒णा वरु॑णाय दा॒शुषे॑ दे॒वेभ्यो॑ दाशद् ध॒विषा॑ वि॒वस्व॑ते ॥

10.065.06 May that cow, the leader of the rite, which yielding her milk proceeds uncalled to the consecrated place (of sacrifice), may she, propitiated by me, yield her milk to (me), the offerer of oblations to liberal Varun.a and the (other) gods. [Milk: of strength, gauh = thunder, ma_dhyamika_ va_k; cf. RV 8.100.11; offer of oblations: vivasvati = madhyam deva_n paricarate; da_s'us.e = an epithet of Varun.a].

Va_lakhilya IV.1 refers to Manu Vivasvat and Trita as sacrificers and that their Soma pleased Indra.

यथा॒ मनौ॒ विव॑स्वति॒ सोमं॑ श॒क्रापि॑बः सु॒तम् ।

यथा॑ त्रि॒ते छन्द॑ इन्द्र॒ जुजो॑षस्य् आ॒यौ मा॑दयसे॒ सचा॑

पृष॑ध्रे॒ मेध्ये॑ मात॒रिश्व॒नीन्द्र॑ सुवा॒ने अम॑न्दथाः ।

यथा॒ सोमं॒ दश॑शिप्रे॒ दशो॑ण्ये॒ स्यूम॑रश्मा॒व् ऋजू॑नसि ॥

8.052.01 As you, S'akra, did drink the effused Soma from Manu Vivasvat, as you did accept the hymn from Trita, so do you gladden yourself with A_yu. 8.052.02 You did enjoy, Indra, the effused drink with Pr.s.adhra, Medhya and Ma_taris'van, just as you did drink the Soma with Das'as'ipra, Das'on.ya, Syumaras'mi, and R.junas.

त्वष्टा॑ दुहि॒त्रे व॑ह॒तुं कृ॑णो॒तीती॒दं विश्व॒म् भुव॑नं॒ सम् ए॑ति ।

य॒मस्य॑ मा॒ता प॑र्यु॒ह्यमा॑ना म॒हो जा॒या विव॑स्वतो ननाश ॥

अपा॑गूहन्न् अ॒मृता॒म् मर्त्ये॑भ्यः कृत्वी सव॑र्णाम् अददु॒र् विव॑स्वते ।

उ॒ताश्विना॑व् अभर॒द् यत् तद् आसी॒द् अज॑हाद् उ॒ द्वा मि॑थु॒ना स॑र॒ण्यूः ॥

10.017.01 Tvas.t.a_ celebrates the marriage of his daughter; therefore, the whole world is assembled; but the mother of Yama, the newly-married wife of the mighty Vivasvat, disappeared. [Deity Saran.yu_: The legend: Saran.yu_,

the daughter of Tvas.t.a_, was given in marriage to Vivasvat, and had by him Yama and Yami_. Intimidated by his ardour, she substituted another female, her shadow, Cha_ya_, for herself, and going to Uttarakuru, changed herself to a mare. Vivasvat begot Manu by Cha_ya_, when, finding his error, he set off to look for his wife. Discovering her disguise, he transformed himself to a horse, and had by his wife the two As'vins]. 10.017.02 The gods concealing the immortal (Sarn.yu_) for th esake of mortals and having formed her, gave her to Vivasvat. She bore the two As'vins when this had happened and then Saran.yu_ gave birth to two twins. [For the sake of mortals: maryebhyah = manus.yebhyas tadutpattyartham, for men, i.e. that men might be born. Manu was the offspring of Vivasvat and the woman resembling Saran.yu_ and all men are descended from Manu; the two twins: Yama and Yami_, but dva_ mithuna_, may mean two pairs of twins, Yama and Yami_, the first pair and the As'vins the second].

> "There can be no doubt that Us.a_sa_nakta_ are ment by the two wives (of Vivasvat) and that their suitor rpresents the sun god. Thus the sun god is certainly called Vivasvat already in the R.V...Sarama_, the mother of the two Sa_rameyas, would be a mythological synonym for Us.as, the mother of the sun and the moon. It is most likely that Saran.yu_, Vivasvat's wife, who abandons 'the twins' and has the same colour as Us.as is not different from Us.as. Then Sarama_ and Saran.yu_ would be linguistic synonyms (provided the latter is not a mere adjecive, which is not at all improbable), and the As'ins and the Sa_rameyas, who faded out in Vedic mythology, would be mythological synonyms." (Hillebrandt, A., *Vedic Mythology*, vol.1, p.32-33).

अपाम् उपस्थे महिषा अगृभ्णत विशो राजानम् उप तस्थुर् ऋग्मियम् ।
आ दूतो अग्निम् अभरद् विवस्वतो वैश्वानरम् मातरिश्वा परावतः ॥

6.008.04 The mighty maruts have seized upon him on the lap of the waters (in firmament), and men have acknowledged him as their adorable sovereign; ma_taris'van, the messenger of the gods, has brought Agni vais'va_nara (hither) from the distant (sphere of the) sun. [Alt. Hillebrandt: The mighty (gods)

seized him in the womb of the waters. The clans worshipped the king, who is worthy of praise. Ma_taris'van brought Agni Vais'va_nara as a messenger of Vivasvat from afar. The gods seize the sun in the womb of the waters.]

तम् अह्यन् भुरिजोर् धिया संवसानं विवस्वतः ।
पतिं वाचो अदाभ्यम् ॥

9.026.04 The worshippers have elevated by the fingers of their arms that unconquerable lord of praise abiding (in the vessels). [Alt. Hillebrandt: WIth the dexterity of the arms they sent the fellow-resident of Vivasvat].

मा नो हेतिर् विवस्वत आदित्याः कृत्रिमा शरुः ।
पुरा नु जरसो वधीत् ॥

8.067.20 Let not this weapon of Vivasvat, this net made with hands, A_dityas, destroy us before old age. [Vivasvat: i.e. Yama, son of Vivasvat; before old age: pura_ = pu_rve nu ida_ni_m sarvadetyarthah jarasah ida_ni_m ji_rn.a_n: let it not destroy us, now and of old infirm]. [Alt. Hillebrandt: Vivasvat = sun].

An:giras

"The earliest rishi who is called an An:giras is the priest Br.haspati who supported the gods (devas) in their war against the Daityas, Da_navas and Asuras...The earlist time at which a real A_n:girasa rishi is alleged to have existed was in the reign o Haris'candra of Ayodhya_, when Aji_garta sold his son S'unahs'epa as a sacrificial victim instead of Rohita, and Aya_sya officiated as a priest at the ceremony...Among the A_n:girasas were the Ka_n.vas, and they are an offshoot from the Paurava line...A Kan.va is mentioned in Dus.yanta's time. He adopted S'akuntala_, and Dus.yanta met her in his hermitage and married her, but this Kan.va is expressly called a Ka_s'yapa...Praga_tha Ka_n.va was contemporary with Durgaha's grandsons...Pr.s.adhra Ka_n.va was contemporary with Dasyavevr.ka...It is clear that the Ka_n.vas sprang from Ajami_d.ha...The Ka_n.vas thus belonged

to the period of the N. Pan~ca_la dynasty...(F.E. Pargiter, 1962 (repr. of 1922 London edn.), *Ancient Indian Historical Tradition*, Delhi, Motilal Banarsidass, pp. 218-228).

"In all, the Anukraman.ika_ shows about 45 different names of men who call themselves after this (An:giras') gotra. (Weber, 'Episches im Vedaritual," SBKPAW, 1891, p. 812 (46); cf. Bloomfield, SBE, XLII, p. xxv). Many of these names are fictitious or mythical, but it would not be corret to banish all of them into the realm of fantasy. We know that Va_madeva, the Kan.vas, the Pajras etc. and also the Maudgalyas counted themselves among the An:giras'. We also know that Bergaigne speaks 'of a primitive liturgy common to the whole family of the An:giras'." (Recherches sur l'Histoire de la Literatur Vedique, p. 192, n.1). An:giraso occurs together with Vessa_mitto, Yamataggi, Bha_radva_jo (Vinaya Pit.aka, vol. I, p. 245). Buddha (as Gautama) is called an An:giraso (ibid., vol. I, p. 25) (cf. JPTS, 1888, pp. 1-2. In RV 1.78.3 a Gotama invokes an:girasvat). Gr.tsamada S'aunaka was once an A_n:girasa S'aunahotra and thence became a Bha_rgava S'aunaka; that is to say, he changed his family just as S'unahs'epa changed his from the clan of the An:giras', to which the gruesome Ajigarta Sauyavasi belonged, to the clan of Vis'va_mitra Bha_Rata. Br.hatsa_man who was pierced by men was an A_n:girasa (AV 5.19.1). Sam.varta A_n:girasa consecrates Marutta A_viks.ita during the Ra_jasu_ya (ABr 8.21.12). Following the example of Hiran.yastu_pa A_n:girasa, the poet of 10.149.5 invoked the god Savitr...The An:giras' are known already to the RV as Sa_ma singers. According to 10.108.8, they belong to the r.s.ayah somas'ita_h. 1.107.2: an:girasa_m sa_mabhih stu_yama_na_h; 10.78.5: vis'varu_pa_ an:giraso na sa_mabhih. Long ago they discovered the cattle with a_n:gu_s.ya sa_man 1.62.2. They took part in breaking open the rock or cowshed and were Indra's assistants 1.51.3; 62.3; 71.2; 132.4; 2.11.20; 20.5; 4.2.15; 16.8; 51.4; 5.45.8; 6.17.6; 18.5 etc. (A Sa_man called an:girasa_m gos.t.ha is known to TMBr 13.9.24). While referring to them, Vedic terminology uses, apart from sa_man, the ouns ucatha 2.20.5; gir 1.121.1; arka, brahman 6.65.5; rava 1.71.2...The later tradition is in complete agreement with the RV. Like the An:giras' of the past, their descendants also sing...

"In TMBr 14.3.32, Aya_sya deprives the A_dityas of their food by eating it and saves himself with Sa_mans; in 16.12.4 as Udga_Tr. he holds sway over the A_dityas and on the day of the Adyasutya_ when he receives the white solar horse as remuneration for the sacrifice, he becomes weak and saves

himself with specific Sa_mans. According to the Anukraman.i_ also Aya_sya is considered the author of RV 9.44-46 and 10.67-68. The last two hymns are dedicated to Br.haspati and at the same time praise the An:giras' who assist Br.haspati. Aya_sya is mentioned in the RV itself: 1.62.7 (?); 10.67.1; 108.8 (where he is mentioned with the An:giras' and the Navagvas); he is one of the mythical progenitors of the An:giras clan...

"We have mentioned earlier the formula with which the Purod.a_s'a cakes are placed: bhr.gu_n.a_m an:girasa_m tapasa_ tapyadhvam. It is said in the RV tha they observe tapas and thus create the cattle (RV 10.169.2; TS 7.4.17b)...The 'cow' which they own according to TBr 2.1.1.1 is another motif from the treasure of theis sagas. It is said in RV 1.139.7 that the gods presented this cow to them...A special saga, typical of theAn:giras', seems to have been connected with the Agniciti, which is closely linked with the An:giras ritual. As an explanation why the tortoise is embedded in the altar, TS 5.2.8.4 says: an:girasah suvargam lokam yatah purod.a_s'ah ku_rmo bhu_tva_nupra_sarpat...

"Often there is an antagonism or a rivalry between the A_dityas and the An:giras'. While A_ditya Bhr.gu and the A_dityas rise out of the flames of the semen of Praja_pati, the An:giras' come out of the 'coals' (probably a fanciful etymology based on the consonance between an:giras and an:ga_ra) and out of the rekindled 'coals' comes Br.haspati. (ABr. 3.34; *Bibliotheca Indica* ed.. II, p. 156)....To sum up, An:giras is the name of an ancient family (clan) which had particular traditions in cult and in myth... [Alfred Hillebrandt (*Vedic Mythology*, 1981, vol.1 (repr.), pp. 108-115].

Dadhyan~c

Dadhyan~c is a sage, a son of Atharvan:

इन्द्रो दधीचो अस्थभिर् वृत्राण्य् अप्रतिष्कुतः ।
जघान नवतीर् नव ॥

1.084.13 Indra, with the bones of Dadhi_ci, slew ninety times nine Vr.tras. [Dadhyan~c = Dadhi_ca and Dadhi_ci, a sage. His bones formed the

thunderbolt of Indra. dadhyan~c, son of Atharvan, like the asuras, was intimidated and tranquilized by his appearance; but, when he went to svarga, the asuras overspread the whole earth. Indra, inquiring what had become of him and if something of him was left behind, was told that the horse's head with which he had at one time taught the madhuvidya_ to the as'vins, was somewhere in existence, but no one knew where. After a search, it was found in the lake S'aryan.a_vat, near Kuruks.etra. With the bones of the skull, Indra slew the asuras (i.e. foiled the nine times ninety or eight hundred and ten, strategems or devices of the asuras or Vr.tras]. The number is accounted for by the legend that in the beginning, the a_suri_ ma_ya_ (demoniac illusion) was practised in the three worlds, for three periods (past, present, and future), thus becoming nine-fold; each was exerted with three s'aktis or energies, thus becoming twenty seven; each was again modified by the three gun.as, thus becoming eighty-one; the scene of their display extended to each of the ten regions of space, thus becoming the nine times ninety of the text, or 810].

"Besides the Bhr.gus and the An:giras', the Atharvans are also mentioned in the hymn to the dead, RV 10.14.6 (Bhr.gus and Atharvan together in RV 10.92.10)...we have to depend on Avesta which knows Atharvan as an agent noun only, viz., as a designation of priests. We can conclude from this that the word was once an appellative in the Veda also, and was, to a certain degree, the precursor of the later designation Agnihotrin. It occurs in the RV only 15 times (Fourteen times if we do not count atharvi_) in 14 (13) hymns...In AV 4.1.7; 7.2.1 he is the pitr. devabandhu...Atharvan and Fire...does not occur often enough so that we can ascribe a particularly prominent share in the fire cult to the Vedic Atharvans. 6.16.13: tvam agne pus.kara_d adhiatharva_ nir amanthata... 6.16.14: tam u tva_ dadhyan:n: r.s.ih putra i_dhe atharvan.ah (cf. also S'Br 6.4.2.3)...In very general terms 1.83.5; 10.92.10; AV 19.4.1 speak of Atharvan mythically as the first sacrificer. Cf. also 1.80.16 where 'Atharvan, Manus.pitr., Dadhyan~c' spread the dhi_. In AV 10.10.12, 17 Atharvan sits consecrated on a golden sacrificial bed of straw...Varun.a who presents 'the cow' to Atharvan (AV 7.104; 5.11.1) is also regarded as his father...The Atharvans use honey as a cult object. RV 9.11.2: abhi te madhuna_ payo' tharva_n.o as'is'rayuh. Dadhyan~c who is a R.s.i and a son of Atharvan -- one of the few names that occur-- informs the As'vins where madhu may be found with Tvas.t.r. (RV 1.117.22) etc. (RV 8.9.7; AV 10.10.12; AV 18.3.54; TA_r 2.10)...The Atharvans receive chariots, horses and cattle as sacrificial gifts from As'vatha (RV 6.47.24)...The Atharvans, Kas'yapa, Kan.va etc., drive away the Raks.as' with a plant (AV 4.37.1). The plants are a_tharvan.i_r

a_n:girasi_r daivi_r manus.yaja_ uta (AV 11.4.16)...if we adhere to the view that the word Atharvan is an appellative name of certain priests, then it would seem to follow that Bhr.gu is the name of a clan and Atharvan the designation of its priests. This is nothing but a hypothesis. But in Ma_ntrika Upanis.ad 10 (ed. Bombay, p. 324b) there is a statement, to which I attach a slightly greater importance than Bloomfield does: pat.hanti bhargava_ hy ete hy atharva_n.o bhr.gu_ttama_h...Gopatha Bra_hman.a 1.2.22...does not support my hypothesis. (atharva_n.as' ca ha va_ a_(a)n:girasas' ca bhr.gucaks.us.i_." [Alfred Hillebrandt (*Vedic Mytholo*gy, 1981, vol.1 (repr.), pp. 118-120].

Trita

Vedic Trita and Avestan Tritha are Soma pressers. Bhr.gus arise from the flames of Praja_pati's seed; An:giras arise from the coals and Trita has his origin in the waters. In such an interpretation, Trita may be seen as the name of an ancestor (like Kutsa or Kan.va).

स त्रितस्याधि सानवि पवमानो अरोचयत् ।

जामिभिः सूर्यं सह ॥

9.037.04 The pure Soma upon the high place (of the sacrifice) of Trita, attended by its kindred rays, has lighted up the Sun.

Macdonell explains Trita as god of lightning. (Macdonell, Mythological studies in the R.gveda, JRAS, 1893, XXV, pp. 419-96). Trita is attributed with the name a_ptya (Note the concordance with Yas.t A_twya; cf. Bartholomae, IF, I, p. 180; Johansson, *Bidrag till Rigtvedas Tolkning*, p.7).

There is a legend narrated in the R.gveda about Trita a_ptya; Trita is at the bottom of the well and connected with water. The motif of the well occurs not only about Trita (or Kutsa) but also about Bhujyu (RV 1.116.4; 117.14; 118.6; 182.6; 7.68.7), Atri (RV 1.116.8; 117.3) , Rebha and Vandana (RV 1.112.5; 116.24; 117.4; 119.6; 10.39.8-9). Water oblations are poured for three A_ptyas: Trita, Dvita and Ekata, to the north of the Viha_ra. (S'Br. 13.4.2.16; cf.

Hillebrandt, vol. 2, n. 627). "In the R.V as well as in later times, the plural form of a_ptya_h is the name of an entire class of beings -- gods or men -- who stand in AitBr. VIII.12.4 next to the Sa_dhyas and between the Vasus, Rudras, A_dityas on the one side and the Maruts and An:giras on the other...These apart, the legend of the buried disc, bowl or treasure may be mentioned." (Hillebrandt, vol.2, p. 194, n. 626).

The r.cas 8.047.13 to 18 explain how Trita A_ptya takes the sin and evil effects upon himself. Avesta notes a thrita, while the R.V mentions trita and dvita. ["...Iranian Thrita, who is regarded as a healer and who received a thousand healing plants from Ahuramazda...Trita...its connection with the Old IRisih triath, 'ocean' (Fick, VWB< 4th edn., I, p. 63; Johansson, IF, IV, p. 143) appears as uncertain as the derivation from tri, 'three'." Hillebrandt, vol.2, p. 195, n. 631).

यद् आविर् यद् अपीच्यं देवासो अस्ति दुष्कृतम् । त्रिते तद् विश्वम्

आप्त्य आरे अस्मद् दधातनानेहसो व ऊतयः सूतयो व ऊतयः ॥

यच् च गोषु दुष्वप्न्यं यच् चास्मे दुहितर् दिवः ।

त्रिताय तद् विभावयर् आप्त्याय परा वहानेहसो व ऊतयः सूतयो व

ऊतयः ॥

निष्कं वा घा कृणवते स्रजं वा दुहितर् दिवः ।

त्रिते दुष्वप्न्यं सर्वम् आप्त्ये परि दद्मस्य् अनेहसो व ऊतयः सूतयो व

ऊतयः ॥

तदन्नाय तदपसे तम् भागम् उपसेदुषे ।

त्रिताय च द्विताय चोषो दुष्वप्न्यं वहानेहसो व ऊतयः सूतयो व ऊतयः ॥

यथा कलां यथा शफं यथ ऋणं संनयामसि ।

एवा दुष्वप्न्यं सर्वम् आप्त्ये सं नयामस्य् अनेहसो व ऊतयः सूतयो व ऊतयः ॥

अजैष्माद्यासनाम चाभूमानागसो वयम् ।
उषो यस्माद् दुष्वप्न्याद् अभैष्माप तद् उच्छत्व् अनेहसो व ऊतयः सूतयो व ऊतयः ॥

8.047.13 Deities, whatever evil is manifest, whatever is concealed, (let it be not found) in Trita A_ptya, keep it far from us; your aids are void of harm, your aids are true aids. [Trita A_ptya is the r.s.i of the hymn. Trita A_ptya was a deity dwelling in remote distance, and consequently evil was sought to be transferred to him; keep it far from us in Trita A_ptya].
8.047.14 Daughter of heaven, (Us.as), whatever ill-omened dream threatens our cattle, keep it, O brilliant one, far from Trita A_ptya; y our aids are void of harm, your aids, are true aids. [Far from Trita A_ptya: trita-ya a_ptya_ya: keep it far away for Trita A_ptya; R.cas 14 and 15 are used in A_s'vala_yana's Gr.hy Su_tras to be recited after an unpleasant dream].
8.047.15 Daughter of heaven, whatever ill-omened dream threatens Trita A_ptya, we transfer it to the worker of gold ornaments or to the maker of garlands; your aids are void of harm, your aids are true aids. [Whatever evil dream threatens the worker of gold ornaments or the maker of garlands, that evil, abiding in Trita A_ptya (or the son of the waters), we Tr.tas throw off from ourselves; i.e. we throw it off on Trita A_ptya].
8.047.16 Us.as, bear (elsewhere) the ill-omened dream for Trita and Dvita, who eat and do (in dreams) that (which is eaten and done amiss when awake) and who obtain that (inauspicious) portion; your aids are void of harm, your aids are true aids. [Bear elsewhere: i.e., let the eating of honey etc., perceived in a dream, produce happiness as in a waking state; trita and dvita: for dvita, cf. S'atapatha Bra_hman.a 1.2.3.1].
8.047.17 As (in the sacrifice) we put severally together the proper parts and the hoofs, and as we discharge a debt, so we transfer all the ill-omened dream that rests on A_ptya; your aids are void of harm, your aids are true aids. [As in the sacrifice they place together the kala_, the heart etc., as fit to be cut to pieces, and the s'apha, the hoof, bones etc. as unfit; another explanation is: kala_ = s'apha or hoof. The words kala_ and s'apha occur together in Taittiri_ya

Sam.hita_ 6.1.10, where the process of buying the Soma is desscribed; s'apha = the eighth part of a cow; kala_ = a very small portion of a cow; that rests on A_ptya: or, we transfer all the ill-omened dream to A_ptya].
8.047.18 May we be today victorious, and obtain (happiness); may we be free from evil; Us.as, may that ill dream depart, of which we were afraid; your aids are void of harm, your aids are true aids.

The R.gveda su_kta 1.105 is by r.s.i: trita a_ptya or kutsa a_n:girasa; devata_: vis'vedeva_; chanda: tris.t.up

चन्द्रमा अप्स्व् अन्तर् आ सुपर्णो धावते दिवि ।
न वो हिरण्यनेमयः पदं विन्दन्ति विद्युतो वित्तम् मे अस्य रोदसी ॥

1.105.01 The graceful-movingmoonspeeds along the middle region in the sky; bright golden rays (my eyes) behold not your abidding-place. Heaven and earth, be conscious of this (my affliction). [candrama_h suparn.ah: suparn.aih = s'obhana-patana, the elegantly-going; or, possibly connected with the ray of the sun called supran.a, which gives the moon its light; your abiding place: a reference to the supposed position of Trita at the bottom of the well, which, being covered over, shuts out from him all visible objects; be conscious of this: the text has, 'heaven and earth, know of this of me' (vittam me asya rodasi), i.e. 'be aware of this my affliction', or, 'attend to this my hymn'].

अमी ये सप्त रश्मयस् तत्रा मे नाभिर् आतता ।
त्रितस् तद् वेदाप्त्यः स जामित्वाय रेभति वित्तम् मे अस्य रोदसी ॥

1.105.09 Those which are the seven rays (of the sun), in them is my navel expanded; Trita, the son of the waters, knows that (it is so), and he praises them for his extrication (from the well). Heaven and earth, be conscious of this (my affliction). [na_bhi = navel; tes.u su_ryaras'mis.u adhya_tmam saptapra_n.aru_pen.a varma_nes.u, identifying the solar rays with the seven vital airs abiding in the ruling spirit; this is perhaps an allusion to the navel as the seat of the soul. Son of the waters: a_ptya = a_pya = apa_m putra, son of the waters].

त्रितः कूपे ऽवहितो देवान् हवत ऊतये ।
तच् छुश्राव बृहस्पतिः कृण्वन्न् अंहूरणाद् उरु वित्तम् मे अस्य रोदसी ॥
अरुणो मा सकृद् वृकः पथा यन्तं ददर्श हि ।
उज् जिहीते निचाय्या तष्टेव पृष्ट्यामयी वित्तम् मे अस्य रोदसी ॥

1.105.17 Trita, fallen into the well, invokes the Gods for succour; Br.haspati, who liberates many from sin, heard (the submission). Heaven and earth, be conscious of this (my affliction).

1.105.18 Once, a tawny wolf beheld me faring on my way, and having seen me, rushed upon me, (rearing) as a carpenter, whose back aches (with stooping, standing erect in his work). [The wolf, like the carpenter, was u_rdhva_bhimukha (standing in presence erect). If vr.ka = moon and ma_ sakr.t (me once) is rendered ma_sakr.t (month-maker), the rendering is: the moon, having contemplated the constellations goind along the path of the sky, became united with one of them; paying, therefore, no attention to Trita in the well].

यद् अक्रन्दः प्रथमं जायमान उद्यन् समुद्राद् उत वा पुरीषात् ।
श्येनस्य पक्षा हरिणस्य बाहू उपस्तुत्यम् महि जातं ते अर्वन् ॥
यमेन दत्तं त्रित एनम् आयुनग् इन्द्र एणम् प्रथमो अध्य् अतिष्ठत् ।
गन्धर्वो अस्य रशनाम् अगृभ्णात् सूराद् अश्वं वसवो निर् अतष्ट ॥

1.163.02 Trita harnessed the horse which was given by yama; Indra first mounted him, and gandharva seized his reins. Vasus, you fabricated the horse from the sun. [Trita = Va_yu, as pervading the three regions; Yama = Agni; gandharva = Soma; Vasus = demi-god or personified solar rays; su_ra = a_dityaman.d.ala, the solar sphere].

1.163.03 Your horse is Yama and you are A_ditya; you are Trita by a mysterious act; you are associated with Soma. The sages have said there are three bindings of you in heaven. [By a mysterious act: guhyena vratena gopani_yena, durdina ru_pen.a va_ karman.a_ sarvatra vya_ptiru_pen.a, by a secret nature of a cloudy day,or an act of a universally penetrating character; the three bindings: bandhana_ni tri_n.i = utpattika_ran.a_ni, media of origin, that is the Vasus, A_ditya and heaven].

पि॒तुं नु स्तो॑षम् म॒हो ध॒र्मा॑णं॒ तवि॑षीम् ।
यस्य॑ त्रि॒तो व्य् ओज॑सा वृ॒त्रं विप॑र्वम् अ॒र्दय॑त् ॥

1.187.01 I glorify Pitu, the great, the upholder, the strong, by whose invigorating power Trita slew themutilated Vr.tra. [Anna-devata_ = anna, the divinity presidingover food, or merely food; pitu = pa_lakam, that which nourishes; Trita = Indra; he whose fame is spread through the three worlds; or, tr.stha_na-indraha, the three-stationed Indra: Yajurveda 34.7].

अ॒भि स्ववृ॑ष्टि॒म् मदे॑ अस्य॒ युध्य॑तो र॒घ्वीर् इ॑व प्रव॒णे स॑स्रुर् ऊ॒तयः॑ ।
इन्द्रो॒ यद् व॒ज्री धृ॒षमा॑णो॒ अन्ध॑सा भि॒नद् व॒लस्य॑ प॒रिधीँ॑र् इ॑व त्रि॒तः ॥

1.052.05 His allies, exhilarated (by libations), preceded him, warring against the withholder of the rain, as rivers rush down declivities. Indra, animated by the sacrificial food, broke through the defences of Vala as did Trita through the coverings (of the well). [paridhi_r iva tritah: tritah, triple or threefold;hence, 'as through triple coverings or defences'. A legend is: Ekata, Dvita and Trita were three men produced in water by Agni, for the purpose of removing or rubbing off the relics of an oblation of clarified butter (like three blades of sacred grass used to rub off. Another legend: Agni threw the cinders of burnt-offerings into water, whence arose Ekata, Dvita and Trita (called A_ptyas or sons of water). Trita went to draw water from a well and fell into it; Asuras heaped coverings over the mouth of the well to prevent his escape, but he broke through them. Indra's breaking through the defences of Vala, the asura is compared to this exploit of Trita].

Mithraism

Mithraism (Mihr, friend; also sun; Mithras was the Persian word for 'contract'. Mithras was also known as Mithra, Mitra, Meitros, Mihr, Mehr, and Meher.) emerged in ancient Persia ca. 1500 BC.

Avestan texts (the Zoroastrians' holy book) divide the Iranian year into two equal parts or seasons. The first season was summer or 'Hama' and the second was winter or 'Zayana'. The coming of the two seasons would be celebrated through No Ruz and Mihregan. The later is the festival dedicated to Mihr Izad. It is celebrated on the 16th of the seventh month (Mihr) at the time of the harvest festivals and beginning of the winter. It has been the second most elaborate celebration after No Ruz. The festival is called 'Mithrakana' in Avesta and means 'belonging to Mithra'.

Mihr has been Mithra in Avesta and Mitrah in Phahlavi. It is the yazata of the covenant and of loyalty. It has come from the word mei, meaning exchange. In Avesta he is the protector of 'Payman e Dousti' (contract of friendship). In modern Persian it means love and kindness. He is the lord of ordeal by fire (walking through fire to prove innocence, story of Siavash in Shahnameh) and presides over judgment of the soul at death. Ancient Greeks identified him with Apollo. Mihregan (Mehregan) By: Massoume Price http://www.iranonline.com/festivals/mehregan-english-2/index.html

"The basic doctrine of Mithraism, as far as can be told, is that Mithras was a god who was born from a rock and destined to secure the salvation of the world; to do this he was commanded by the god Apollo (through the intermediary agent of a raven) to slay the Bull from the region of the Moon, which was said to represent the fullness of life. Mithras was reluctant to do this but acquiesced in deference to the divine will; in the ensuing struggle between god and bull, other animals joined in - the dog, and scorpion and the snake. After Mithras was successful a quarrel broke out between Mithras and Apollo, but they were reconciled and celebrated a banquet."
- Peter Clark, Zoroastrianism, *An Introduction to an Ancient Faith*, pp. 157-158

In the Avesta , the sacred Zoroastrian writings (see ZOROASTRIANISM) of the ancient Persians, Mithra appears as the chief yazata (Avestan, "beneficent one"), or good spirit, a nd ruler of the world. He was supposed to have slain the divine bull, from whose dying body sprang all plants and animals beneficial to

humanity. After the conquest of Assyria in the 7th century BC and of Babylonia in the 6th century BC, Mithra became the god of the sun, which was worshipped in his name. http://www.fwkc.com/encyclopedia/low/articles/m/m016002159f.html

Dog is essential in Zoroastrianism in confirming the passage of life after death. "The soul is said to hover around the body for three days, and so three days and nights of prayers are performed in the presence of the corpse. A dog is brought out to 'gaze' upon the body. This rite, known as sagdid, in a sense confirms that the body is dead. A dog was thought in earlier times to have the power of discerning between life and death; a dog is also said to be a favored Ahuric creature, capable of slaying three thousand demons in a night. "After the three-day period, the pall-bearers will take the corpse to the... dakhma or 'tower of silence'. "
- Peter Clark, Zoroastrianism, *An Introduction to an Ancient Faith*, p. 116

"Dating from around the 15th century BC, Mithraism emerged in ancient Persia. 'Mihr' (the Persian form of Mithras) was the word not only for the Sun but also for a friend; and that seems to be how this pagan god was originally worshipped - as both supreme sun god and god of love." [*Quest for the Past*]See the Cosmic mysteries of Mithras by David Ulansey "During...the 'Age of Taurus,' lasting from around 4,000 to 2,000 B.C., the celestial equator passed through Taurus the Bull (the spring equinox of that epoch), Canis Minor the Dog, Hydra the Snake, Corvus the Raven, and Scorpio the Scorpion (the autumn equinox): that is, precisely the constellations represented in the Mithraic tauroctony (bull-slaying)."

http://www.well.com/user/davidu/mithras.html

Mithras as the constellation Persius killing Taurus the bull; Mithras is **accompanied by a dog,** a snake, a raven, and a scorpion, is shown in the act of killing a bull. It is notable that a dog is placed on the horizontal strut of the copper model Daimabad chariot



.http://home.fireplug.net/~rshand/streams/gnosis/mithra.html

The grammatical style and vocabulary of the Gathas and the hymns of the Rig Veda are similar. In the Indian Vedic tradition, particularly during the period of the Bra_hman.as, rites related to the processing of Soma were dominant; in the Avestan tradition, belief was the dominant theme and Haoma was only a ritual accompanying the adoration of Ahura Mazda, the Lord Wisdom..

"The Gathas were passed on from generation to generation, for a long time orally but later in written form, by the priests who recited them as part of their ritual worship and eventually committed them to writing. It is believed that even when their meaning was forgotten or simply ceased to be understood, the mere sounds of the words, being sacred in themselves, were faithfully remembered and taught from priest to priest."
"Zarathushtra's Gathas belong to a specific category of ancient poetry, represented in both Iranian and Indian traditions and characterized by defined metrical constraints (which the often untraditional Zarathushtra is not afraid to ignore when the occasion demands it), by an esoteric content and highly allegorical use of language. The technique required for composing this kind of poetry was learnt over many years of study and it presupposes an educated and privileged studentship drawn from the priestly class."
- Peter Clark, Zoroastrianism, *An Introduction to an Ancient Faith*, p. 2

"Of great importance is the [Vedic] concept of rta, the law regulating the cosmos, which was under the protection of Varuna and Mitra in the Vedic system. The Zoroastrian notion of Asha, often rendered as 'righteousness', also conveys the meanings 'truth' and 'order'. Asha, a concept with which rta may be equated, is an empowering force which emanates directly from Ahura Mazda and which differs in this respect from the Vedic rta, which was essentially

distinct from the gods themselves. There is, in Vedic religion, a merely philosophical distinction between order and chaos (nirriti), whereas for Zarathushtra there is an ethical distinction to be made between Asha and drug (deceit). And although Varuna and Mitra seem to have been accessible only through ritual, Zarathushtra establishes a link between humanity and Ahura Mazda that is not solely dependent upon the mediations of the priesthood. In the Hindu world rta was gradually supplanted by dharma, but in the religion of Zarathushtra the significance of Asha has never diminished." - Peter Clark, Zoroastrianism, *An Introduction to an Ancient Faith*, p. 5-6

"Adapting the old Vedic Brahman tradition of men wearing a sacred thread over one shoulder which was knotted for them by a priest during their initiation and is never untied, Zoroaster decreed that the sign of membership in his religious community, but for both men and women, would be a thin cord worn as a girdle, passed three times round the waist and knotted at back and front. After initiation - which took place at the age of fifteen - and every day for the rest of their lives, believers must untie and retie the girdle repeatedly when praying, its three coils likely intended to signify the thoughts, words and deeds by whose sum they would be judged after death." - Paul William Roberts, *Journey of the Magi* (1995) p. 153

In the Younger Avesta, 8 different priestly functions are outlined: (Nirangastan: Book II, Chpt. XXVII)

1.Zaotar -- the leading priest
2.Haavanaan -- the priest who prepares the haoma
3.Aatarvakhsh -- the priest who kindles the sacred flame
4.Frabortaar -- the priest who presents things at the offering
5.Aasntaar -- the priest who washes the haoma
6.Rathwishkar -- the priest who mixes the haoma with the fresh milk
7.Aaberet -- the priest who bears the water
8.Sraoshaavarz -- the priest who has to superintend.

It is quite clear that, certainly in later Avestan times, the priesthood was divided functionally according to the various tasks each priest performed. It is also interesting to note that the terms used are functional descriptions and indicate that there was a degree of specialization amongst the priesthood. In Gathic times, while there may not have been the same number of functions,

there is every reason to believe that this same functionality also existed. In fact, Gnoli (1980: p.156) differentiates between the term 'zaotar' being used to define an entire class, as opposed to one that merely defines a function.

The Gathas give us four terms: (1) zaotar, (2) ma(n)thran, (3) usig, and (4) karapan. Each of these is a term used for a priest, although of differing race and function.

Zaotar was the chief or officiating priest, and was used by Zarathushtra to describe himself (the term itself has been translated as 'invoker' or as 'sacrificial priest', but we will deal with this later when we discuss Zarathushtra), and exactly corresponds to the Skt. 'hotar', who was also the chief or officiating priest in Vedic times.

Ma(n)thra has been defined as "formulated meditation, the utterance which was the 'instrument of thought'" (Boyce: 1989a, p. 8). Boyce goes on to state: "The mathra accompanied rituals; and of old an INSPIRED PRIEST would compose such utterances. ... Zoroaster repeatedly uses an Iranian equivalent, 'mathran', of himself. In general, it seems, PRIESTLY utterances were regarded as inspired in the strictest sense, being revealed or revealing themselves, for such inspiration was held to come either from a deity or from a faculty within the priest himself" (ibid.) (Emphasis added.)

The Avestan term 'usig' has an exact correspondence to Skt. 'usij'. While 'usig' appears once in the Gathas (Y. 44.20), 'usij' appears approximately 30 time in the RigVeda. The 'usij-s' are the priests who aid the warriors in their bid to raid cattle (Lincoln: 1981, p. 61). And it was for this reason that they are condemned by Zarathushtra in the Gathas -- "...the karapan and the usig take hold of the cow for wrathful treatment..." (Humbach and Ichaporia: 1994: Y. 44.20). Burrows (1973: p. 131) finds 'usij' to be a proto-Indoaryan term for a certain class of priest. Burrows further argues that the proto-Indoaryan warriors (mairya-s) were the cattle rustlers who preyed on the peaceful, pastoralist Iranians and wrought so much destruction and evil; and it was the 'mairya-s' (the proto-Indoaryan warriors) along with their priests, the 'usij-s' and the 'karapan-s', who were the 'daeva' worshippers. The three principal 'daeva-s': Indra, Nanghaithya, and Saurva; were Indo-Aryan or proto-Indoaryan gods (Burrows: 1973, p. 128), and it was these 'daeva-s' (along with the proto-Indoaryan priests and warriors) who Zarathushtra condemned.

The term 'karapan' can be derived from the Skt. 'kalpa-' (rite), or from the Avestan 'karp-' (to mumble), (Burrows: 1973, p.132). In the former sense it would be associated with a proto-Indoaryan priestly function. In the latter, it was used derogatorily to describe these same priests, who in Zarathushtra's opinion, were to be condemned, since they too were 'daeva' worshippers.

Thus, it is clear that Zarathushtra's wrath was exclusively aimed at the proto-Indoaryans, the cattle-raiders, and THEIR PRIESTS (the 'usig-s' and 'karapan-s'), whom he labeled the 'daeva' (false gods) worshippers. THERE IS NOT EVEN THE SLIGHTEST HINT IN THE GATHAS, THE YOUNGER AVESTAN OR PAHLAVI LITERATURE THAT ZARATHUSHTRA EVER CONDEMNED THE IRANIAN PRIESTHOOD. This distinction is extremely important.

In 1930, Dumezil proposed that the Indo-European society was divided into three classes, and further that since this tripartite division was a characteristic of the Indo-Europeans, the daughter families, and very specifically the Indo-Iranians, were also subject to the same tripartite division: (1) priests (Av. zaotar, Skt. hotar), (2) warriors (Av. rathaeshtar, Skt. kshatriya), and (3) herdsmen (Av. vaastryo.fsuyant, Skt. vaisya). (See Frye: 1993, p. 21 for an elaboration of Dumezil's theory; see also Lincoln: 1981, p. 134; Duchesne-Guillemin: 1973, p. 122). However, this theory has been fairly controversial, with ardent supporters on both sides of the issue. Geiger, (1886, p. 64), in fact had, nearly half a century earlier, stated that the Gathic society of Zarathushtra's time was divided between (1) priests and (2) herdsmen, with the herdsmen ready at all times to pick up arms and fight to defend their possessions. Boyce (1987: p. 523; 1989b) too, endorses this bipartite division of Gathic society. Regardless of whether there existed a bipartite or tripartite division, from a historical point of view, it is fairly incontrovertible that a priesthood existed among the Indo-Iranians, as well as within its daughter groups, the Iranians and the Indo-Aryans. By the time of the Younger Avestan period however, there is no doubt that a clear tripartite division of society had been established in Iran.

Around 3000 BC, the Indo-Iranians, a branch of the Indo-European family of peoples, started migrating southwards from the steppes of Central Asia. By 2000 BC, the Indo-Iranians themselves had separated into two branches, the Indo-Aryans who migrated South-eastwards and settled in the Northwest of

India; and the Iranians who migrated South-westwards and settled on the Iranian plateau (Boyce: 1987, p. 513)

Proto-Indoaryans: These were the people of Indo-Aryan stock, who had already separated from the Iranians but, who either settled and remained behind in Iran and Central Asia, or who had followed in later migratory groups which did not make it all the way to India (see Burrows: 1973). Note that Burrows (ibid.: p. 125) also classifies the "Aryans" who migrated Westward and who were found in the Near Eastern kingdom of Mittani, as proto-Indoaryans.

In both the pairs of words, the direction of change is apparent: s > h.

> Áss (OE o:s) , pl. Aesir (OE o:s) goes back to PGmc *ans- (see Jordanes' Latinised Gothic ansis 'deities, demigods'). There are various etymological suggestions regarding this word, but it was only after the loss of the nasal in some Germanic dialects that it acquired a superficial resemblance to Indo-Iranian *asura-. [Piotr Gasiorowski in the Cybalist group]

Sanskrit is much earlier than Avestan given the locus of the texts of the early language: on the banks of the River Sarasvati_ which got gradually desiccated and finally dried up in the stretches of the Great Indian desert, ca. 1900 BC. The banks of this river are the principal locale for the r.cas.

Hittite texts on horses and chariots, found at Bogaz Khoy (Hattussas ~ 1,300 BCE) show that the technology was Indian -- not Iranian. A hypothesis: Meluhhans and Vedics from the south-east, Elamites from the south-west meet with the steppes. Avestan emerges in east and west Iran.

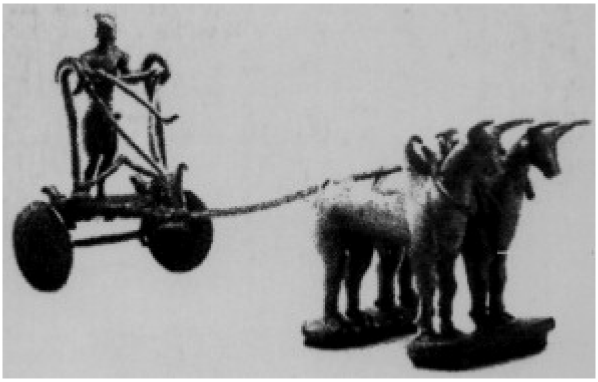
Relative Chronologies: Xvaniratha, Vedic and Avestan; soma, haoma; kavi us'anas and kayanids

> "Zoroastrians were given gracious sanctuary on Indian shores more than a millenium ago. We bow our heads to India, which has given us full religious freedom, unlike any other country in the world. India is indeed the world's truest religious democracy."

http://www.ozemail.com.au/~zarathus/tenets33.html

A dog and two birds on the Daimabad Chariot (?xvani-ratha, svanad-ratha)

Daimabad, 2nd millennium chariot.



Yas.t X.67 notes that Mitra comes, driving in a chariot, from the eastern continent Arezahi_ to the splendid continent Xvanirata.

ratwya citra hacimno_

xvarenanhaca mazdada_ta

veretragnca ahurada_ta

'(Mitra comes) equipped with prompt energy, Mazda_h-created fortune, and Ahura-created victoriousness' (Gershevitch, I., 1959, *The Avestan Hymn to Mithra*, Cambridge; Geldner emends citra in favour of caxra; Bartholomae renders cixra as 'Tatkraft, Energie', or caxra, wheel; if the reading is ratwya caxra hacimno_, the meaning may be: '(Mitra comes) associating himself, i.e. according to, the circle of fixed time'. 'The idea conveyed is that Mitra visits the continent **Xvanirata** at appointed times which are looked upon as moving in a circle.': Mehendale, M.A., Some remarks on Mihir Yas.t (Yas.t X), in: Dharmadhikari, T.N., ed., 1981, *Golden Jubilee Volume*, Vaidika Sams'odhana Mandala, Poona).

"It has a front guard consisting of two vertical curved bars with turned upper ends, whereas the lower ends are attached to a horizontal bar which, in its turn, has two ring loops for the axle. The guard also has two horizontal bars fixed to it. Of these, the upper one is straight while the lower one is angular. The guard is further strengthened by two oblique bars soldered together in a dog standing on the central pole just in front of the guard. The platform on which rises the guard has on its either side a pair of birds formed into one by merging bodies, but having their heads in opposite directions. Stylistically they are related to the terracotta bird whistles from Harappan sites." (Kosambi, 1965) [cf. different views of the Daimabad chariot at: Sali, S.A. 1986. *Daimabad 1976-79*. New Delhi: Archaeological Survey of India; Fig.10.55 from Allchin, B.and Raymond Allchin, 1982, *The rise of civilization in India and Pakistan*, Cambridge Univ. Press; Fig. 4.5 from Kosambi, D.D., 1965, *The culture and civilisation of ancient India in historical outline*, London, Routledge and Kegan Paul].

The two birds on the Daimabad chariot model are comparable to the two birds shown on a boat on a Mohenjodaro tablet.

m1429b Tablet. Mohenjodaro. A boat with two birds facing opposite directions.

What was the dog called in the 2nd millennium; and what does it connote? Two possibilities:

rata4-vraNa, rata4-zAyin, ratA7nduka, ratA7marda = dog (Skt.) rathya_mr.ga = a street animal, dog (Skt.lex.)

zvan 1 m. (nom. sg. du. pl. %{zvA} , %{zvAnau} , %{zvAnas} ; weakest base %{zun} cf. 2. %{zuna} &c. , p. 1082 ; in some comp. %{zvA} for %{zva} cf. below) , a dog , hound , cur RV. &c. &c. ; (%{zunI4}) f. a female dog.[Cf. Zd. {spa1} ; Gk. $; Lat. {canis} ; Lit. {szu4} ; Goth. {hunds} ; Eng. {hound} ; Germ. {Hund}.] cuva_, cuva_nam = dog (Ta.)

svan = to adorn (Dha_tup. 19.62) tuvi-s.van.as = loud-sounding [svana = roaring water]; sva_nin = noisy, turbulent (RV); svani_ka = having a fair or radiant countenance (as Agni)(RV)[svani= fire (Agni)] sva_ni-ratha = sva_nad ratha (having a rattling chariot, RV; cf. Monier Williams) khvaniratha (Av.)(German. schwan; Anglo Sax. swin).sva_n = making sound (RV 1.104.1); sva_nah = sound (RV 5.2.10; also name of one of the guards of the Soma (Taittiri_ya Sam.hita_ 1.2.7.13). sva_ni-ratha = rattling chariot.

The terms used in Avestan are: hvanirathem, hvaniratha, khaniratha, which is one of the 7 keshvars (or karshvare: regions, continents) of the earth:

> Yasna 57.30. We worship Obedience the blessed and the stately, who though lofty and so high, yea, even to the girdle, yet stoops to Mazda's creatures, (31) who thrice within the day, and three times of a night, will drive on to that Karshvar Hvaniratha, called the luminous, as he holds in both the hands and poizes his knife-like battle-ax, which flies as of itself, and to cleave the Daevas' skulls, (32) to hew down Angra Mainyu, the wicked, and to hew down Rapine of the bloody spear, to hew down the Daevas of Mazendran, and every Demon-god. For his splendor and his glory, for his might....

> Yasna 65.5. And the (chief) outlet to this one water (Ardvi Sura Anahita) goes apart, dividing to all the seven Karshvars. And this outlet to my river, Ardvi Sura Anahita, bears off its water always in summer and in winter. This my river purifies the seed of men, and wombs of women, and women's milk.

Svanadratha is mentioned in the R.gveda: svanadratha = having a rattling chariot (Skt.lex.) It is unclear if this can be related to the lexeme, 'svani', fire in which case: sva_ni-ratha = svanad-ratha or the ratha which carries the 'agni' for the sacrifice. The symbolism of the 'dog' on the pole of the chariot can then be explained as a grapheme corresponding to the lexeme, 's'van'. The symbolism of the two birds looking at opposite directions may be compared to similar birds depicted on the picture of a boat on a Mohenjodaro tablet; if these are 'direction' or 'navigation' birds, the same 'meaning' can be assigned to the two birds on the Daimabad chariot. In later, younger Avestan texts, xvaniratha (karshvar hvaniratha) is the

name of a continent. The adjective 'luminous' used in Yasna 57.30 is significant, in the context of the interpretation of 'svani' as fire in R.V.

ya r.jra_ mahyam ma_mahe saha tvaca_ hiran.yaya_ es.a vis'va_ny abhy astu saubhaga_san:gasya svanadrathah

RV 8.1.32: (Praise me, saying), "He who has presented riches to me with a golden purse; may this rattling chariot of Asan:ga carry off all the treasures (of my enemy)". [The allegorical reference to svanadratha is to Agni, fire (anointed with marrow) carrying the soma…]

In the context of the soma purification (treatment) process, svani (in tuvi- and mahi-shvan.i) = fire, hence also called a synonym of agni. Thus, sva_ni-ratha is a land where agni is the 'chariot' or vehicle. So, MBh. Vana Parva, Ch. 219, Verse 15 notes: svana is the son of agni, called Satya; the agent which causes disease to livin things. Agni got this name because human beings produce svana (pitiable cryy) when afflicted with diseases. The semantic expansion of svana- is more elaborate in the Vedic than in Avestan which seems to refer to this morpheme only in the context of Airyanem Vae_jah or Arya Vis'a, the land mass circumscribed by two rivers: Ranha_ and Vanhi_... [End cross-posting from indology list].

Vedic and Sanskrit sememes which explain Av. khvaniratha, hara_, rasa_ and vanhi_ da_itya_ are provided below with the suggestions that khvaniratha is the land (semant. lit.Agni-traversed) between the rivers Sarasvati_ and Gan:ga_; that hara_ is the Himalayan range near Kashmir; that rasa_ = Sarasvati_ and that vanhi_ = Ja_hnavi_ or Gan:ga_ [Av. da_itya_ = AV. dahyate_ = is burnt; dayhati (Pali), i.e. burnt vasa_ or burnt marrow]:

Two terms used in describing soma processes: rasa_ and va_say; both terms can be explained in terms of (1) liquid ore; also, melted butter; and (2) melted fat, greasy serum or marrow of flesh [a clear reference to two of

the main ingredients used in intensifying the fires: butter and marrow/flesh]

The two terms are also assigned to two rivers which bound the area called khvaniratha (svanad-ratha or the domain of the agni - vehicle): ranha_ and vanhi_ (which can be equated with the Vedic versions of the terms: rasa_ and ja_hnavi_, two terms which are elaborated further in post-vedic mythology).

Khvaniratha is bounded by two rivers which emanate from the mount Hara_.Harahaura is a tract of land lying between the Sindhu and Jhelum and the Gandgarh mountain and the Salt Range (Arch. S. Rep. Vol. V, p. 79 and Br.hatsam.hita_ 14.33; loc.cit. NL Dey]; Haramukta = the mount Haramuk in Kashmir, 20 miles north of S'rinagar (Dr. Stein's Ra_jataran:gin.i II, p. 407) Allegorically, hara_ refers to gold: hara_s'aya = resting in gold (TS 1.2.11.2, MS 1.2.7); haras = flame, heat, fury (RV 10.87.25); see also vr.s.n.o harasa a_yavah, the sons of A_yu, for the ardour of the bull Pada harase: harasa a_harta_rah a_yavah manus.ya_h (RV 10.158.2); hara-ya_n.a = whose cart is full of gifts or having a golden car (Vedic. Lex.) ha_rava = an asura born from the tear drops of Brahma_; he was burnt to death in the flames emerging from S'ivalin:ga (Skanta P. 5.2.48). The Haramukut.a peak is near the Ma_nasa lake. The Haracaritacinta_man.i narrates a legend regarding its name, Haramukut.a. (See Stein). Hara_ was called the Peak of Hara_ (ttaira harasya) (See Bailey, Khotanese Texts IV, Cambridge, 1961, 12). In Pahlavi, it is called Te_rag. "The Peak of high Hara_…around which circle the stars and moon and sun" (Yt. 12.25). Water from this mountain descends to the world and meets the sea Vourukas'a, which in turn is sourced from Harahvaiti_ Aredvi_ Su_ra_, also descending from the high Hara_ (Boyce, p. 136). At the centre of Vourukas'a stands a mountain, "of the bright metal which is the substance of the sky", that is, the crystal (GBd. 9.8 (BTA, 95): khvan-a_hin, ke_ go_hr I_ asma_n).

rasa = a liquid ore (Arthas'a_stra 2.12.2); rasapa_ka = the smelting of liquid ores (Arth. 2.12.1); rasaviddha = smelted from liquid ores (Arth. 2.13.3) rasa = melted butter (Skt.) yadatra ripta rasinah sutasya (VS 19.35): rasin = juicy, pungent (RV 8.1.26); ripta = smeared [ripta-lepa (A_pS'S.2128)] rasa = juice of soma (RV 8.3.20); essence (RV 5.43.4); ras = to roar, bray [note that sva_n also is connected with rattling sound; hence, ra_sabha = the carrier of the as'vins (RV 1.116.2); ra_spin = roaring (RV 1.122.4)]; rasa_ = moisture, flood (RV 8.72.13); yasya samudram rasaya_ saha_huh 'rasa_bhirnadi_bhih' : rasa_ = name of a river (RV 10.75.6) cf. rasa_yana = elixir vitae (MBh.); rasa_in = substance (e.g. wax or lac) put in the joint of a water-vessel to prevent it leaking (N.); rasa_n = ingredients in working metals (B.); rasa_n.a = substances for polishing metals (Or.)(CDIAL 10659).

va_say = to gild (Arth. 2.13.46) [?fr. vas = assume (a form), enter into (Dha_tup. 24.13)]; vasa_ = shining, white, the serum or marrow of the flesh (considered by some as distinct from that of the bones), marrow, fat, grease, lard, suet, melted fat, any fatty or oily substance; vasa_-graha = a ladle full of melted fat (Ka_tyS'r.)(Monier Williams lex.)

ja_hnavi_ = gan:ga_ (Harivam.s'a 1.ch.27); the hermitage of R.s.i Jahnu is said to be at Jahngira near Sultanganj, weswt of Bhagalpur [N.L. Dey, 1979, Geographical Dictionary of Ancient and Mediaeval India, New Delhi; the dictionary explains six jahnus: Bhairavaghat.i_ below Gan:gotri at the junction of Bha_gi_rathi_ and Ja_hnavi_; at Kanya_kubja; at Jahngir in Sultanganj; at Shibganj above Rampur Boalia; at Gour near Malda; and at Jahnagar west of Nadia; thus six distinct locations on the Gan:ga_ are related to Jahnu]. Jahna_vi_ = Jahnu's family (RV 1.116.19) [jahman = water (Naigh. 1.12); cf. jon:gani_ = a vessel for holding water (Arth. 2.14.23)] Ra_ma_yan.a locates Ja_hnavi_ south of the Himava_n flowing close to Tamasa_ (Tons, a tributary, together with River Giri, of Sarasvati_ river system, flowing beyond

Paontasa_heb] Govindapur copper plate of Laks.man.asena describes Hughli river as Ja_hnavi_.

jahnu = name of an ancient king and sage (son of Ajami_d.ha, of Suhotra, of Kuru, of Hotraka; an ancestor of the Kus'ikas; see also MBh. 1.12; Ra_ma_yan.a 1.44.35 for the Jahnu legend of the river discharged from Jahnu's ears) jahnu = pl. Jahnu's race (AitBr. 7.18; Ta_n.d.ya Br. 21.12.2); jahnu-saptami_ the seventh day in the light half of Vais'a_kha; jaj_hn.ava = part. Of Vis'va_mitra (Ta_n.d.ya Br. 21.12); of Suratha (BhP 9.22.9); the Gan:ga_ (MB h. 3.5.13) (Skt. lex.) There is also a play on the words in some legends related to R.s.i Jahnu using the semant.: janu = knee (RV); ja_nhu~_ knee (WPah.)(CDIAL 5195) and jan = to be born.

Atharva veda refers to the deficiency in name; this stanza is used, as a primary authority by some scholars, to justify the identification of Soma as the moon, since dars'a is interpreted as the slender crescent of the moon:

'O stem of Soma (somasyams'o), lord of the combatant (yudha_m), you are indeed not-deficient by name (nùno nama); make me, O first sight (darša) not-deficient (anu_nam), both by progeny and wealth.' (AV. VII.86.3).

Soma, has the radical su, to press; pressing is the key process. Soma is that which is pressed. In the developing allegory, Soma is seen to be released from the cover, Vritra or the 'aryan dragon motif or Vritra, who possesses the waters, using the vajra thunderbolt. Buschardt also observes that the mountains which are Vritra's body are also the same on which the Soma plants grow; Vritra-killing and Soma-pressing are one and the same act; Soma-pressing is Soma-killing; killing signifies making him 'whole' and this is creation. Vajra is a concept related to the reducing agents: Lahiri summarizes Buschardt's perceptions succinctly. "Buschardt traced the origin of the vajra, the weapon with which Indra kills Vritra, to the cultic implements the pressing stone used to crush the Soma-stalks, or pestle.

The exchange value of gold and silver in Vedic times, is elaborated in metaphorical terms related to wealth and lineage: such as food, cattle, rain; progeny.

The vedi (altar) is the earth and as the agni (fire) raises towards the heaven, the poetic imagination of the r.s.is (priests) expands into realms of cosmological thoughts, unparalleled in recorded history of early human civilizations. Thus, at a cosmic level, the R.gveda raises profound philosophical questions which have been the fountain-head of Indian philosophical traditions.

The following su_kta is called bha_vavr.tta, and does not give any name of a deity to whom the r.cas are dedicated. This is the theory of evolution of primeval matter, i.e. the emergence of the material and anti-material universe (sat and asat). This is mystic poetry par excellence and tries to resolve the riddle of the origin of the universe and ends with an epilogue: ‘he verily knows it, or perhaps he knows not.” so an:ga veda yadi va_ na veda. The vyakta (finite) merges into a-vyakta (infinite) at the end of the Kalpa and emerges at the dawn of the next Yuga. Brahma_ completes his lifetime of 100 Brahmic years and then both the material and anti-material universe dissolves leaving nothing behind. Only the indefinable Great Eternal Life- Energy remains dormant but pulsating and beyond this, nothing exists. Some say that the evolutionary process began with the appearance of a_pah and salila: **a_po va_ idam agre salilam a_si_**t (TS 7.1.5.1).

pu_rn.amadah pu_rn.am idam pu_rn.a_t
pu_rn.amudacyate
pu_rn.asya pu_rn.ama_da_ya pu_rn.ameva_’ va_s’is.yate

That is full; that is full; out of the full the full emerges;
deduct full from the full, (still) the full alone remains.
This is the quintessence of Vedic cosmology.

r.s.i: praja_pati parames.t.hi_; devata_; bha_vavr.tta; chanda: tris.t.up

नास॑द् आसी॒न् नो सद् आ॑सीत् त॒दानी॒ नासी॒द् रजो॒ नो व्योमा प॒रो यत्।

किम् आव॑रीवः॒ कुह॒ कस्य॒ शर्म॒न्न् अम्भः॒ किम् आ॑सी॒द् गह॑नं गभी॒रम् ॥

न मृ॒त्युर् आ॑सीद् अ॒मृतं॒ न तर्हि॒ न रात्र्या॒ अह्न॑ आसीत् प्रके॒तः । आनीद्

अवातं स्वधया तद् एकं तस्माद् धान्यन् न परः किं चनास ॥ तम आसीत् तमसा गूळ्हम् अग्रे ऽप्रकेतं सलिलं सर्वम् आ इदम् । तुच्छ्येनाभ्व् अपिहितं यद् आसीत् तपसस् तन् महिनाजायतैकम् ॥ कामस् तद् अग्रे सम् अवर्तताधि मनसो रेतः प्रथमं यद् आसीत् । सतो बन्धुम् असति निर् अविन्दन् हृदि प्रतीष्या कवयो मनीषा ॥ तिरश्चीनो विततो रश्मिर् एषाम् अधः स्विद् आसी३द् उपरि स्विद् आसी३त् । रेतोधा आसन् महिमान आसन् स्वधा अवस्तात् प्रयतिः परस्तात् ॥ को अद्धा वेद क इह प्र वोचत् कुत आजाता कुत इयं विसृष्टिः । अर्वाग् देवा अस्य विसर्जनेनाथा को वेद यत आबभूव ॥ इयं विसृष्टिर् यत आबभूव यदि वा दधे यदि वा न । यो अस्याध्यक्षः परमे व्योमन् सो अङ्ग वेद यदि वा न वेद ॥

10.129.01 The non-existent was not, the existent was not; then the world was not, not the firmament, nor that which is above (the firmament). How could there by any investing envelope, and where? Of what (could there be) felicity? How (could there be) the deep unfathomable water? [The non-existent: sat, asat: visible and invisible existence (asat s'as'avis.a_n.avatrirupa_khyam na_si_t: Taittiri_ya Sam.hita_
7.1.5.1); matter and spirit, prakr.ti and purus.a; the First Cause or Brahma_ was in the beginning undeveloped in its effects, and existed before either inactive matter or active spirit; nothing else existed, neither matter nor spirit; and consequently He created both; investing envelope: each element as created or developed is invested by its rudiment; of what could there be felicity: i.e., of whom or of what living being could enjoyment, or fruition, whether of pain or pleasure, be predicated, there being no life?]
10.129.02 Death was not nor at that period immortality, there was no indication of day, of night; That One unbreathed upon breathed of his own strength, other than That there was nothing else whatever. [Breathed: svadha_ = ma_ya_, or

prakr.ti (illusion or nature), the source of the world of phenomena; s'a = breathed along with ma_ya_].
10.129.03 There was darkness covered by darkness in the beginning, all this (world) was undistinguishable water; that empty united (world) which was covered by a mere nothing, was produced through the power of austerity. [Austerity: tapas = not penance, but the contemplation of things which were to be created: yah sarvajn~ah sarvavit yasya jn~a_namayam tapah: Mund.a.ka Upanis.ad 1.1.9].
10.129.04 In the beginning there was desire, which was the first seed of mind; sages having meditated in their hearts have discovered by their wisdom the connexion of the existent with te non-existent. [Desire: i.e., in the mind of the Supreme Being].
10.129.05 Their ray was stretched out, whether across, or below, or above; (some) were shedders of seed, (others) were mighty; food was inferior; the eater was superior. [Their ray was stretched out: a reference to the suddenness of creation, which was developed in the twinkling of an eye, like the flash of the sun's ray. It was so quick that it was doubtful whether the things in the central space (across) were created first, or those above or those below; i.e., creation took place simultaneously in all three portions of the universe. This was the order in which things were created, but the development of the world was like a flash of lightning, so that the series could not be distinguished (tatsr.s.t.va_ tadeva_nupra_vis.at: Taittiri_ya A_ran.yaka 8.6). Thus the notion of a series, viz., from a_tma_ came the a_ka_s'a, from the a_ka_s'a the wind, from the wind fire etc., is reconciled: a_tmana a_ka_s'ah sambhu_ta a_ka_s'a_dva_yurva_yoragnih: Taittiri_ya A_ran.yaka 8.1; whether across, or below, or above: tiras'cinah = across, tiryaksrotas, that in which the stream of life is horizontal, i.e., the animal world; among the created objects some were living creatures, others were great, as the sky etc., the former being the enjoyers (bhokta_rah), the latter the things to be enjoyed (bhojyah), so the creation was distinguished as the food and the feeder].
10.129.06 Who really knows? Who in this world may declare it! whence was this creation, whence was it engendered? The gods (were) subsequent to the (world's) creation; so who knows
whence it arose? [Whence was it engendered: i.e., from what material cause, and from what creative cause, did it arise?]
10.129.07 He from whom this creation arose, he may uphold it, or he may not (no one else can); he who is its superintendent in the highest heaven, he assuredly knows, or if he knows not (no one else does). [sa bhagavah kasmin pratis.t.hita: Cha_ndogya Upanis.ad 7.24.1].

In such a perspective, the entire R.gveda can be viewed as an allegory, the human quest for achieving material which has exchange value, in transcending the material level to realms of philosophical explorations, and in expanding the semantic and morphological limits of language to attain new insights into the very concept of 'meaning', using language, through metrical, chanted mantras, as a means of understanding the a_tman and the parama_tman, thereby, attaining svarga, or bliss.

All the su_ktas are thus, governed by a framework of four principal metaphors, rendered in scintillating, ecstatic, spiritual poetic resonance : word, prayer, gods, material well-being. An epitomy of this framework may be seen from the following selections:

9.063.25 The brilliant purified Soma-juices are let fall amidst all praises. 9.063.27 The purified (juices) are poured forth from heaven and from the firmament upon the summit of the ground. [The summit of the ground: i.e., the raised place, the place of divine sacrifice or yajn~a].

पवमाना असृक्षत सोमाः शुक्रास इन्दवः । अभि विश्वानि काव्या ॥ पवमाना दिवस् पर्य् अन्तरिक्षाद् असृक्षत । पृथिव्या अधि सानवि ॥

The Jaimini_ya Upanis.ad Bra_hman.a notes, while analyzing the r.ca RV 1.164.41, that Ka_madugha_ is a divinity, the cow of desires. (Jaim,. Up. Br. 1.10.1-2; Aitareya A_ran.yaka 1.3.2). Taittiri_ya A_ran.yaka (1.9.4) cites the r.ca (RV 1.164.41) as a laudation of Va_k.

गौरीर् मिमाय सलिलानि तक्षत्य् एकपदी द्विपदी सा चतुष्पदी ।
अष्टापदी नवपदी बभूवुषी सहस्राक्षरा परमे व्योमन् ॥

1.164.41 The sound (of the clouds) has been uttered, fabricating the waters, and being one-footed, two-footed, four-footed, eight-footed, nine-footed, or infinite in the highest heaven. [In the highest heaven: the sound gauri_: clouds

or sky, as differently originated; in one station, ekapadi_, from the clouds; in two, dvipadi_, from the clouds and sky; in four, the four quarters of space; in eight, the four points and four intermediate points of the horizon; or from them and the zenith,navapadi_, nine-stationed; articulate speech, gauri_: single as the crude form only, double as declension and conjugation, fourfold as nouns, verbs, prepositions and particles; eightfold as the eight cases, including the vocative; and ninefold as the same, with the addition of indeclinable; articulate sound, gauri_: diversified according to the nine parts of the body whence it may be supposed to proceed, navel, chest, throat; the highest heaven is hr.daya a_ka_s'a, ethereal element of the heart, as the basis of speech, mu_la_dha_re].

[Atharvaveda notes that Agni was the germ received by the waters: (…ya_ agni garbha dadhire suvarn.a_sta_ na a_pah s'am syona_ bhavantu: AV 1.33.1: agni of beauteous colour, assumed Agni as embryo—let these watgers be weal, pleasant to us).

आपो ह यद् बृहतीर् विश्वम् आयन् गर्भं दधाना जनयन्तीर् अग्निम् ।
ततो देवानां सम् अवर्ततासुर् एकः कस्मै देवाय हविषा विधेम ॥

10.121.07 When the vast waters overspread the universe containing the germ and giving birth to Agni, then was produced the one breath of the gods -- let us offer worship with an oblation to the divine Ka. [The germ: i.e., the germ of the world, Brahma_. The birth of Hiran.yagarbha, or Brahman, in and from the mundane egg, as described in Manu is alluded to; yat, tatah: from that (cause) from which].

परो दिवा पर एना पृथिव्या परो देवेभिर् असुरैर् यद् अस्ति । कं स्विद् गर्भम् प्रथमं दध्र आपो यत्र देवाः समपश्यन्त विश्वे ॥ तम् इद् गर्भम् प्रथमं दध्र आपो यत्र देवाः समगच्छन्त विश्वे । अजस्य नाभाव् अध्य् एकम् अर्पितं यस्मिन् विश्वानि भुवनानि तस्थुः ॥

10.082.05 What was that embryo which was beyond the heaven, beyond this earth, beyond the gods, beyond the asuras, which the waters first retained, in which all the gods contemplated each other?

10.082.06 The waters verily first retained the embryo in which all the gods were aggregated, single deposited on the navel of the unborn (creator), in which all beings abide. [The embryo is Vis'vakarman. arpitam an.d.am = mundane egg; or, bi_jam].

S’atapatha Bra_hman.a notes: a_po vai janayodbhyo sarvam ja_yate (S’B 6.8.2.3; 11.1.6.1; 1.1.1.14; 2.1.1.4; 4.5.7.7; 6.1.3.11) linking motherhood or birth with the waters. The earth is established on the waters (apsu pr.thivi_ pratis.t.hita_: Jaimini_ya Upanis.ad Bra_hman.a 1.2.3.2). The concept is echoed: a_po va_ambayah (Kaus.ika Bra_hman.a 12.1); a_po asma_n ma_tarah (Taittiri_ya Sam.hita_ 1.2.1.1; 1.3.8.2; 1.1.5.1; 1.2.2.1). What is the primal cause of creation: some say, it is the waters, some say it is Agni and others say it is the earth:

आपो भूयिष्ठा इत्य् एको अब्रवीद् अग्निर् भूयिष्ठ इत्य् अन्यो अब्रवीत्।

वधर्यन्तीम् बहुभ्यः प्रैको अब्रवीद् ऋता वदन्तश् चमसाँ अपिंशत॥

1.161.09 Waters are the most excellent said one (of them). Agni is that most excellent, said another; the third declared to many the Earth (to be the most excellent), and thus speaking true things the R.bhus divided the ladle. [The earth: vardhayanti_m = a line of clouds or the earth: vadhah arkah (Nirukta 2.20.7)].

Water divinities are the nymphs flowing in water (apsu yos.a_). Kaus.i_taki Upanis.ad equates Apsaras with Amba_s (mothers), amba_yavi_s (nurses) and ambayas (little mothers)(KU 1.3). The term, ‘apsaras’ lit. means, ‘those who move on the water’ and are often in the company of gandharvas: [Note the depiction of apsras pouring water from vases in the sculpture of Sarasvati_ as river goddess in Ellora caves, va_ka_t.aka, 5th cent. A.D. Apsaras are said to swim about in a lake in the form of aquatic birds: S’B11.5.1.4. A legend has it that Apsaras S’akuntala conceived Bharata at Naa_d.apit; Bharata later conquered the whole earth and performed more than a thousand as’vamedha yajn~as for Indra (S’B 13.5.4.13)] Waters are the great goddesses: a_po devirbr.hati_rvis’vasambhuvah: Taittiri_ya Sam.hita_ 6.1.2.3)

न यत् पुरा चकृमा कद् ध नूनम् ऋता वदन्तो अनृतं रपेम ।

ग॒न्ध॒र्वो अ॒प्स्व् अप्या॑ च॒ योषा॒ सा नो॒ नाभिः॑ प॒र॒मं जा॒मि तन् नौ ॥

10.010.04 (Yama speaks). We have not done what was done formerly; for how can we who speak truth, utter now that which is untrue? Gandharva (the sun) was in the watery (firmament), and the water was his bride. She is our common hence our near affinity.

Three Vedas are for Agni, Va_yu and Su_rya

Jaimini_ya su_tra (2.1.35-37) refers to vedatrayi_ which are the R.gveda, Yajurveda and Sa_maveda. Aitareya Bra_hman.a (5.32) refers to the trayi_ as follows: veda_ aja_yanta r.gveda evegnera_ja_tah, yajurveda vayoh sa_maveda a_ditya_t. This is echoed by Manu (Ch.1): agniva_yu ravibhyastu trayam brahma sana_tanam. RV 10.90.9 refers to the three Vedas:

तस्मा॑द् य॒ज्ञात् स॑र्व॒हु॒त ऋच॒ः सामा॑नि जज्ञिरे ।

छन्दां॑सि जज्ञि॒रे तस्मा॒द् यजुस् तस्मा॑द् अजायत ॥

10.090.09 From that victim, in whom the universal oblation was offered, the r.cas and sa_mans were produced; from him the metres were born; from him the yajus. was born. [tasma_d yajn~a_t = from that simple portion surnamed the universal sacrifice, sarvahu_tah, meaning Purus.a as the world; yajn~a = yajn~asa_dhana, the material of sacrifice, i.e., the victim. Purus.a is the spiritual cause and effect of material creation; it is from him, not from the ideal or real sacrifice, that all things originate].

Br.hada_ran.yakaopanis.ad (2.1.10) refers to 4 vedas: **asya mahato bhu_tasya nivasitametad yad r.gvedo yajurvedah sa_mavedotharva_n:girasah**. Mun.d.akopani.s.ad (1.1.5) says: **tatra_para_ r.gvedo yqajurvedah sa_mavedothyarvavedah**. Maha_bha_rata S'alya parva (41.3-4), Dron.a parva (51.22), Vis.n.u pura_n.a (1.3.20), Matsya pura_n.a (144.11) also refer to the 4 vedas. Of the four priests, hota_, udga_ta_, adhvaryu and brahma_, the last-named is the priest of Atharvaveda. Brahma_ is the head of the yajn~a; he purifies the manas: sa va_ es.a tribhirvedairyajn~asya_nyatarah paks.ah samskryate manasaiva brahma_ yajn~asyasyanyataram paks.am samskaroti. The other three priests purify outer aspects of the yajn~a, the priest brahma_ purifies the manas. The Atharvaveda includes treatises on philosophy, medicine and also on politics. Explaining a mixed system of monarchy and

democracy, the Veda talks of samiti, vis'ah, ra_s.t.ra, mantra ra_jya; The vis'ah or peoples' representatives elect a king in the samiti (AV 3.4.2). Samiti functions with oratorical flourishes. The Veda deals with Brahma_, the Ultimate Reality and hence is also called the Brahmaveda. Su_ktas with philosophical import are: ka_lasu_kta (19.53), skabhasu_kta (10.7); the fifteenth ka_n.d.a with 220 mantras and 18 hymns is vra_tyaka_n.d.a, speculations on the Brahman or a Vedis social sect.

The Atharvan of R.gveda is the A_tar of Avestan.

Section 10 River Sarasvati: Bha_ratam Janam

Bha_rata and Bha_ratam Janam

Article 1 of the Constitution of India (which came into being on 26 January 1950), **“Inda, that is Bharat, shall be a Union of States.”**

The word, ‘Bharat’ has a long history which takes us back to the days of the R.gveda and to Bha_rati_, another name of Sarasvati_. The sapling of the nation-state took root, germinated and flowered on the soil of the Sarasvati River Basin, giving a structural framework to a cultural identity that dates back to the Sarasvati Civilization and to the R.gveda which was revealed and orally transmitted from the banks of River Sarasvati_. The central locus of the R.gveda is a region peopled by Bha_ratam Janam.

R.gveda (r.ca 3.53.12) uses the term, 'bha_ratam janam', which can be interpreted as 'bha_rata folk'. The r.s.i of the su_kta is vis'va_mitra ga_thina. India was called Bha_ratavars.a after the king Bharata. (Va_yu 33, 51-2; Bd. 2,14,60-2; Lin:ga 1,47,20,24; Vis.n.u 2,1,28,32).

य इमे रोदसी उभे अहम् इन्द्रम् अतुष्टवम् ।
विश्वामित्रस्य रक्षति ब्रह्मेदम् भारतं जनम् ॥

3.053.12 I have made Indra glorified by these two, heaven and earth, and this prayer of Vis'va_mitra protects the race of Bharata. [Made Indra glorified: indram atus.t.avam-- the verb is the third preterite of the casual, I have caused to be praised; it may mean: I praise Indra, abiding between heaven and earth, i.e. in the firmament].

न सायकस्य चिकिते जनासो लोधं नयन्ति पशु मन्यमानाः ।
नावाजिनं वाजिना हासयन्ति न गर्दभम् पुरो अश्वान् नयन्ति ॥
इम इन्द्र भरतस्य पुत्रा अपपित्वं चिकितुर् न प्रपित्वम् ।
हिन्वन्त्य् अश्वम् अरणं न नित्यं ज्यावाजम् परि णयन्त्य् आजौ ॥

3.053.23 Men, (the might) of the destroyer is not known to you; regarding him as a mere animal, they lead him away desirous (silently to complete his devotions); the wise condescend not to turn the foolish into ridicule, they do not lead the ass before the horse. [Legend: Vis'va_mitra was seized and bound by the followers of Vasis.t.ha, when observing a vow of silence. These were the reflections of the sage on the occasion: disparaging the rivalry of Vasis.t.ha with himself, as if between an ass and a horse: sa_yakasya = of an arrow;here explained, to destroy, avasa_naka_rin.ah; lodham nayanti = they lead the sage; lodha = fr. lubdham, desirous that his penance might not be frustrated, tapasah ks.ayo ma_ bhu_d iti, lobhena tus.n.i_m sthitam r.s.im pas'um manyama_na, thinking the r.s.i silent through his desire, to be an animal, i.e., stupid; another interpretationin Nirukta: **lubdham r.s.im nayanti pas'um manyama_nah, they take away the desiring r.s.i, thinking him an animal; na ava_jinam va_jina_ ha_sayanti: va_jina** = fr. vac, speed, with ina affix; interpreted as srvajn~a, all knowing; the contrary avajina = mu_rkha, a fool].

3.053.24 These sons of Bharata, Indra, understand severance (from the Vasis.t.ha not association (with them); they urge their steeds (against them) as against a constant foe; they bear a stout bow (for their destruction) in battle.[Sons of Bharata: descendants of Vis'va_mitra whose enmity to the lineage of Vasis.t.ha is here expressed; the enmity reportedly occurred on account of Vis'va_mitra's disciple the Ra_ja_ suda_s; Anukraman.ika_ states that Vasis.t.has hear not the inimical imprecations: antya abhis'aparthas ta vasis.t.adevas.in.yah na vasis.t.hah s'r.n.vanti; Niruktam: sa vasis.t.hadves.i_ r.k-aham ca kapis.thalo vasi.s.hah atas tana nirbravi_mi, this and the previous verse are inimical to the Vasis.t.has and he is of the race of Vasis.t.ha, of the Kapis.thala branch].

Alt. trans. (Griffith):"These men, the sons of Bharata, O Indra, regard not severance or close connexion. They urge their own steed, as it were another's, and take him, swift as the bow's string, to battle."

In r.ca 1.63.7 (r.s.i: Nodha_s Gautama), Suda_sa is called a Pu_ru:

त्वं ह त्यद् इन्द्र सप्त युध्यन् पुरो वज्रिन् पुरुकुत्साय दर्दः ।

ब॒र्हिर् न यत् सु॒दासे॒ वृथा॒ वअगूइ१५७७ष अं॒हो रा॑ज॒न् वरि॑वः पू॒रवे॑ कः ॥.

1.063.07 Indra, wielder of the thunderbolt, warring on behalf of Purukutsa, you did overturn the seven cities; you did cut off for Suda_sa wealth of An:has, as if (it had been a tuft) of sacred grass, and did give it to him, O king, ever satiating you (with oblations). [Purukuts ais a r.s.i. Suda_sa is a king. An:as is an asura].

The genealogy of Bharata according to the R.gveda:

त्वाम् ई॑ळे॒ अध॑ द्वि॒ता भ॑र॒तो वा॒जिभि॑ः शु॒नम् ।
ई॒जे य॒ज्ञेषु॑ य॒ज्ञिय॑म् ॥

6.016.04 (R.s.i of the r.ca is: Bharadva_ja Ba_rhaspatya) Bharata, with the presenters of the
oblation, has joyfully praised you in your (two-fold capacity), and has worshipped you, the adorable, with sacrifices. [Bharata: the ra_ja_, the son of Dus.yanta; in your two-fold capacity: in the character of bestowing what is wished for and removing wht is undesired; is.t.a pra_ptyanis.t.a pariha_raru_pen.a_gnir dvidha_].

Bharata had two sons: Devas'ravas and Devava_ta (the Anukraman.i_ make these two the composers of the su_kta RV 3.23); and Sr.njaya was the son of Devava_ta:

अम॑न्थिष्टा॒म् भार॑ता रे॒वद् अ॒ग्निं दे॒वश्र॑वा दे॒ववा॑तः सु॒दक्ष॑म् ।
अग्ने॒ वि प॑श्य बृह॒ताभि रा॒येषां नो॑ ने॒ता भ॑वता॒द् अनु॒ द्यून् ॥

3.023.02 (R.s.i: devas'rava_ and devava_ta bha_rata; OR Vis'va_mitra Ga_thina) The two sons of Bharata, Devas'ravas and Devava_ta, have

churned the very powerful and wealth-bestowing Agni; look upon us, Agni, with vast riches, and be the bringer of food (to us) every day.

दश क्षिपः पूर्व्यं सीम् अजीजनन् सुजातम् मातृषु प्रियम् ।
अग्निं स्तुहि दैववातं दैवश्रवो यो जनानाम् असद् वशी ॥

3.023.03 The ten fingers have generated this ancient (Agni); praise, Devas'ravas, this well-born, beloved (son) of his parents, generated by Devava_ta, Agni, who is the servant of men. [His parents: the two pieces of stick that have been rubbed together by Devava_ta].

अयं यः सृञ्जये पुरो दैववाते समिध्यते ।
द्युमाँ अमित्रदम्भनः ॥

4.015.04 Radiant as this Agni, the subduer of foes, who is kindled on the (altar) of the cast as (he was kindled) for Sr.n~jaya, the son of Devava_ta. [Sr.n~jayas are a people in the west of India: Vis.n.upura_n.a]. A r.ca (RV 6.47.25) refers to a son of Sr.njaya in relation to Bharadva_ja_:

महि राधो विश्वजन्यं दधानान् भरद्वाजान् साञ्जय अभ्य् अयष्ट ॥

6.047.25 The son of Sr.n~jaya has reverenced the Bharadva_jas who have accepted such great wealth for the good of all men.

The r.ca RV 6.61.1 refers to a Vadhryas'va as a son of Divoda_sa

इयम् अददाद् रभसम् ऋणच्युतं दिवोदासं वध्र्यश्वाय दाशुषे ।
या शश्वन्तम् आचखादावसम् पणिं ता ते दात्राणि तविषा सरस्वति ॥

6.061.01 (R.s.i: Bharadva_ja Ba_rhaspatya) She gave to the donor of the oblations, Vadhryas'va, a son Divoda_sa endowed with speed, and acquitting

the debt (due to gods and progenitors), she who destroyed the churlis niggard, (thinking) only of himself, such are your bounties, Sarasvati_. (Divoda_sa: Vis.n.u Pura_n.a makes the father of Divoda_sa, Bahvas'va but this is a representation of the nameBandhyas'va; the churlish niggard: Pan.i is the obvious reference].

Ks.atras'ri_ is the son of Pratardana (who is the patron of r.s.i of the R.ca 6.26.8 Bharadva_ja Ba_rhaspatya):

अहं चन तत् सूरिभिर् आनश्यां तव ज्याय इन्द्र सुम्नम् ओजः ।
त्वया यत् स्तवन्ते सधवीर वीरास् त्रिवरूथेन नहुषा शविष्ठ ॥

6.026.08 May we, adorable Indra, your friends, at this your worship, offered for (the acquisiiton of) wealth, be held most dear to you; may Ks.atras'ri_, the son of Pratardana, (my patron), by most illustrious through the destruction of foes, and the attainment of riches.

The r.ca 7.33.14 may also refer to a Pratardana; the term used is: Pratr.dah; Sa_yan.a however interprets it as a reference to the Tr.tsu:

उक्थभृतं सामभृतम् बिभर्ति ग्रावाणम् बिभ्रत् प्र वदात्य् अग्रे ।
उपैनम् आध्वं सुमनस्यमाना आ वो गच्छाति प्रतृदो वसिष्ठः ॥

7.033.14 Pratr.ts, Agastya comes to you; welcome him with devoted minds, and he in the foremost station directs the reciter of the prayer, the chanter of the hymn, the grinder of the stone, and repeats (what is to be repeated). [Pratr.ts = Tr.tsus; in the foremost station: agre, in front, that is, as their Purohita].

R.s.i Vasis.t.ha Maitra_varun.i_ (RV 7.18.22-23) notes that Suda_sa is the grandson of Devavat (Devava_ta?); and that Suda_sa is the son of Divoda_sa; the r.ca RV 7.18.22 notes that Devava_ta is the son of Pijavana:

द्वे नप्तुर् देववतः शते गोर् द्वा रथा वधूमन्ता सुदासः ।

अर्हन्न् अग्ने पैजवनस्य दानं होतेव सद्म पर्यू एमि रेभन् ॥
चत्वारो मा पैजवनस्य दानाः स्मद्दिष्टयः कृशनिनो निरेके ।
ऋज्रासो मा पृथिविष्ठाः सुदासस् तोकं तोकाय श्रवसे वहन्ति ॥

7.018.22 Praising the liberality of Suda_sa, the grandson of Devavat, the son of Paijavana, the donor of two hundred cows, and of two chariots with two wives, I, worthy (of the gift), circumambulate you, Agni, like the ministrant priest in the chamber (of sacrifice).

7.018.25 Maruts, leaders (of rites), attend upon this (prince) as you did upon Divoda_sa, the father of Suda_sa; favour the prayers of the devout son of Pijavana, andmay his strength be unimpaired, undecaying].

R.s.i R.jra_s'va Va_rs.a_gira notes a Sahadeva as a Bharata:

एतत् त्यत् त इन्द्र वृष्ण उक्थं वार्षागिरा अभि गृणन्ति राधः ।
ऋज्राश्वः प्रष्टिभिर् अम्बरीषः सहदेवो भयमानः सुराधाः ॥

1.100.17 Indra, showerer (of benefits), the Va_rs.a_gira_s, R.jra_s'va and his companions, Ambaris.a, Sahadeva, Bhayama_na, and Sura_dha_s, address to you this propitiatory praise].

R.s.i Va_madeva Gautama refers to Somaka as the son of Sahadeva:

एष वां देवाव् अश्विना कुमारः साहदेव्यः ।
दीर्घायुर् अस्तु सोमकः ॥

4.015.09 Divine As'vins, may this prince, Somaka, the son of Sahadeva, your (worshipper), enjoy long life.

A son of Sahadeva is referred to in the following r.cas by r.s.is Va_madeva Gautama:

बोधद् यन् मा हरिभ्यां कुमारः साहदेव्यः ।
अच्छा न हूत उद् अरम् ॥
उत त्या यजता हरी कुमारात् साहदेव्यात् ।
प्रयता सद्य आ ददे ॥
एष वां देवाव् अश्विना कुमारः साहदेव्यः ।
दीर्घायुर् अस्तु सोमकः ॥
तं युवं देवाव् अश्विना कुमारं साहदेव्यम् ।
दीर्घायुषं कृणोतन ॥

4.015.07 When the prince, the son of Sahadeva, promised (to present) me with two horses, I withdrew not when called before him. [I withdrew not: accha_ na hu_ta udaram = a_bhimukhena kuma_ren.a hu_ta san ta_vas'va_valabdi_ va_ na nirgatava_n asmi, being called by the present prince, I did not go forth without receiving the two horses].
4.015.08 But immediately accepted those two excellent and well-trained horses from the prince, the son of Sahadeva.
4.015.09 Divine As'vins, may this prince, Somaka, the son of Sahadeva, your (worshipper), enjoy long life.
4.015.10 Divine As'vins, do you two make the prince, the son of Sahadeva, long-lived.

R.ca 4.38.1 notes that Pu_ru were ruled by a king called Trasadasyu who is adored with epithets, ardhadeva and vr.trahan:

उतो हि वां दात्रा सन्ति पूर्वा या पूरुभ्यस् त्रसदस्युर् नितोशे ।
क्षेत्रासां ददथुर् उर्वरासां घनं दस्युभ्यो अभिभूतिम् उग्रम् ॥

4.038.01 (R.s.i: Va_madeva Gautama) Trasadasyu has bestowed upon many the ancient (gifts) which were obtained by the liberal (prince) through your (favour, Heaven and Earth) you two have given a horse, a son, a weapon (for the destruction) of the Dasyus, fierce and foe-subduing. [Heaven and earth: the dual pronoun, va_m, of you two, implies heaven and earth; you two have given a horse, a son: ks.etra_sa_m : from ks.etra, land; urvara_sa_m: urvara, fertile soil; san = to give].

The r.ca of Sobhari ka_n.va (RV 8.22.7) is emphatic that Tr.ks.i is the son of Trasadasyu:

उप॑ नो वाजिनीवसू या॒तम् ऋ॒तस्य॑ प॒थिभिः॑ ।
येभि॑स् तृ॒क्षिं वृ॑षणा त्रासदस्य॒वम् म॒हे क्ष॒त्राय॒ जिन्व॑थः ॥

8.022.07 Rich in food, As'vins, come to us by the paths of sacrifice, those by which showerers (of benefits), you went to gratify Tr.ks.i, the son of Trasadasyu, with vast wealth. [Alt. trans. (Griffith): Come to us, Lords of ample wealth, by paths of everlasting Law; Whereby to high dominion y with mighty strength raised Tr.ks.i, Trasadayu's son].

यद् इ॑न्द्र॒ नाहु॑षी॒ष्व् आओजो॑ नृम्णं च॑ कृष्टिषु॑ ।
यद् वा॒ पञ्च॑ क्षिती॒नां द्युम्नम् आ भ॑र स॒त्रा विश्वा॑नि॒ पौंस्या॑ ॥
यद् वा॑ तृक्षौ म॑घवन् द्रु॒ह्याव् आ जने॒ यत् पू॒रौ कच् च॒ वृष्ण्य॑म् ।
अ॒स्मभ्यं॒ तद् रि॑रीहि॒ सं नृषाह्ये॒ ऽमित्रा॑न् पृत्सु तु॒र्वणे॑ ॥

6.046.07 Whatever strength and opulence (exist) among human beings, whatever be the sustenance of the five classes of men, bring Indra to us, as well (as) all great manly energies.

6.046.08 Whatever vigour, Maghavan, (existed) in Tr.ks.u, in Druhyu, in Puru, bestow fully upon us in conflicts with foes, so that we may destroy our enemies in war.

[Alt. trans. (Griffith): 'All strength and valour that is found, Indra, in tribes of Nahus.as, and allt he splendid fame that the Five tribes enjoy, bring all manly powers at once. Or, Maghavan, what vigorous strength in Tr.ks.i lay, in Druhyus or in Pu_ru's folk, fully bestow on us that, in the conquering fray, we may subdue our foes in fight'. Griffith adds: 'Tr.ks.i: a King so named, says Sa_yan.a.']

अ॒स्माक॒म् अत्र॑ पि॒तर॒स् त आ॑सन् स॒प्त ऋष॑यो दौर्ग॒हे ब॒ध्यमा॑ने ।

त आय॑जन्त त्र॒सद॑स्युम् अ॒स्या इन्द्रं॒ न वृ॑त्र॒तुर॑म् अर्ध॒देवम् ॥

पु॒रु॒कुत्सानी॑ हि वा॒म् अदा॑शद् ध॒व्येभि॑र् इन्द्रावरुणा॒ नमो॑भिः ।

अथा॒ राजा॑नं त्र॒सद॑स्युम् अस्या वृत्र॒हणं॑ ददथु॒र् अर्ध॒देवम् ॥

4.042.08 The seven r.s.is were the protectors of this our (kingdom) when the son of Durgaha was in bonds; performing worship they obtained for (his queen) from the favour of Indra and Varun.a, Trasadasyu, like Indra the slayer of foes, dwelling near the gods. [Trasadasyu: Purukutsa, son of Durgaha, being a prisoner, his queen propitiated the seven r.s.is to obtain a son who might take his father's place; they advised her to worship Indra and Varun.a, in consequence of which Trasadasyu was born].

4.042.09 (R.s.i: Trasadasyu Paurukutsa OR Va_madeva Gautama) The wife of Purukutsa propitiated you two, Indra and Varun.a, with oblations and prostrations, and therefore you gave her the king Trasadasyu, the slayer of foes dwelling near the gods. [Dwelling near the gods: ardhadevam = deva_na_m sami_pe vartama_nam (yat sarves.a_mardhamindrah : Taittiri_ya Sam.hita_ 5.4.8.3); or, Indra is declared to be one half of all the gods, and therefore, entitled to the largest share of offerings, yat sarves.a_m ardham indrah prati tasma_d indro devata_na_m bhuyis.t.ha bha_ktmah]. [See Hillebrandt, vol. 2, p. 350: Purukutsa was a contemporary of Suda_s].

Bharata Genealogy

The geneaology of Bharata is thus clear from the Rigveda:

S'atapatha Bra_hman.a (1,4,10-19): "Agni Vais'va_nara went burning along the earth from the River Sarasvati_ to Videha; Agni burnt over the Paurava territory (including North Pan~ca_la) and the Ayodhya_ realm...it might mean that the reformed brahmanism passed from the Bha_rata kingdom to Ayodhya_ and then to Videha". (n. 2, Pargiter, p. 311). "(Bharata's) territory included the tract beween the rivers Dr.s.advati_ and Sarasvati_, and he sacrificed to the latter (MBh 7,68,2384-5; 12, 29, 939-40), which was a large river then. That region probably had some sanctity before, for on the Sarasvati_ was Us'anas-S'ukra's ti_rtha Kapa_lamocana and the river constituted the boundary between the Panjab and the Ganges-Jumna basin, whether it flowed into the Ra_Jputana desert, or especially if the sea extended northwards into that desert then. That region was held by Bharata's successors till long afterwards, and the connexion with them and their development of Brahmanism apparently made it become specially sacred. This is supported by the general statement (ignoring special ma_ha_tmyas) that the most sacred region in the Kr.ta age was Naimis.a forest, in the Treta_ Pus.kara, in the Dva_para Kuruks.etra, and in the Kali age the Ganges. Naimis.a was on the RIver Gomati_ (Va_Yu 2, 8-9; Bd. 1,2,8-9; MBh 3,87,8301-3; 12,357, 13801) in the Ayodhya_ kingdom, thus the site of earliest sanctity in India is placed among the Ma_nvas in the easternregion. So the brahmans whom Puru_ravas came into special conflict with were the rishis of Naimis.a as mentioned above. The Dva_para age began between Divoda_sa's and Suda_s's times. Kuru reigned early in it, from his the region of the Sarasvati_ obtained the name Kuruks.etra, and so both became specially sacred in that age. The region was called Brahma_varta also, though from what time is not clear." (Pargiter, pp. 313-314).

The RV su_kta 6.61 is by r.s.i bharadva_ja ba_rhaspatya and the devata_ is Sarasvati_; in r.ca. RV 6.61.1, Divoda_sa is named as the son of Vadhryas'va:

इयम् अददाद् रभसम् ऋणच्युतं दिवोदासं वध्र्यश्वाय दाशुषे ।
या शश्वन्तम् आचखादावसम् पणिं ता ते दात्राणि तविषा सरस्वति ॥

6.061.01 She gave to the donor of the oblations, Vadhryas'va, a son Divoda_sa endowed with speed, and acquitting the debt (due to gods and progenitors), she who destroyed the churlis niggard, (thinking) only of himself, such are your bounties, Sarasvati_. (Divoda_sa: Vis.n.u Pura_n.a makes the father of

Divoda_sa, Bahvas'va but this is a representation of the name Bandhyas'va; the churlish niggard: Pan.i is the obvious reference].

In r.ca 1.130.7 (r.s.i: Parucchepa Daivoda_si_), Divoda_sa is stated to be a Pu_ru.

भि॒नत् पुरो॑ नव॒तिम् इ॑न्द्र पू॒रवे॒ दिवो॑दासाय॒ महि॑ दा॒शुषे॑ नृतो॒ वज्रे॑ण दा॒शुषे॑ नृतो ।
अ॒ति॒थि॒ग्वाय॒ शम्ब॑रं गि॒रेर् उ॒ग्रो अवा॑भरत् ।
म॒हो धना॑नि॒ दय॑मान॒ ओज॑सा॒ विश्वा॒ धना॒न्य् ओज॑सा ॥

1.130.07 For Pur, the giver of offerings, for the mighty Divoda_sa, you, Indra, the dancer (with delight in battle), have destroyed ninety cities; dancer (in battle), you have destroyed them with (your thunderbolt), for (the sake of) the giver of offerings. For (the sake of) Atithigva, the fierce (indra) hurled S'ambara from off the mountain bestowing (on the prince) immense treasure, (acquired) by (his) prowess; all kinds of wealth (acquired) by (his) prowess. [nr.to = voc.of nr.tu, a dancer; ran.e nartanas'i_la, dancing in war; S'ambara is an asura who was engaged in hostilities with Kr.s.n.a, and finally destroyed, together with his six hundred sons, by Pradyumna, the grandson of Kr.s.n.a (cf. Harivams'a, Langlois, vol. iii, p. 169). Mah_bha_rata represents S'ambara as an adversary of Indra, in Dron.a-vijaya].

Parucchepa Daivoda_si_ is a Bharata and often styled a Pu_ru as seen in RV 1.129.5 and 1.131.4:

नेषि॑ णो॒ यथा॑ पु॒राने॒नाः शू॒र मन्य॑से ।
विश्वा॑नि पू॒रोर् अप॑ पर्षि॒ वह्नि॑र् आ॒सा वह्नि॑र् नो॒ अच्छ॑

1.129.05 Humble the adversary of every one (your worshippers) fierce (Indra), by your aids, like radiant paths, (to glory); by your powerful aids, gude us, hero, as you have guided our forefathers, for you are honoured (by all). You (Indra), who are the sustainer (of the world), remove all (the sins) of man; present at our sacrifice, you are the bearer (of good things).

विदुष् टे अस्य वीर्यस्य पूरवः पुरो यद् इन्द्र शारदीर् अवातिरः

सासहानो अवातिरः ।

शासस् तम् इन्द्र मर्त्यम् अयज्युं शवसस् पते ।

महीम् अमुष्णाः पृथिवीम् इमा अपो मन्दसान इमा अपः ॥

1.131.04 The ancients have have known of that your prowess, by which, Indra, you destroy the perennial cities (of the asuras); you have destroyed them, humiliating (their defenders). You have chastised, Lord of Strength, the mortal who offers not sacrifice; you have rescued this spacious earth and these waters; exulting, (you have recovered) these waters. [purah s'a_radi_h, defended, for a year by walls, ditches and the like: sam.vatsara paryantam pra_ka_ra-parikha_dibhir dr.d.hi_kr.ta_h].

The r.s.i bharadva_ja ba_rhaspatya notes in r.ca RV 6.16.19 that Divoda_sa is a descendant of Bharata, 'bha_rato vr.tr.ha_':

आग्निर् अगामि भारतो वृत्रहा पुरुचेतनः ।

दिवोदासस्य सत्पतिः ॥

6.016.19 Agni, the bearer, (of oblations), the destroyer of the enemies of Divoda_sa, the cognizant of many, the protector of the good, has been brought hither (by our praises).

The r.s.i of RV su_kta 10.102 is mudgala bha_rmyas'va; Mudgala's descendants were of North
Pa_n~ca_la and were 'ks.atriya brahmans' and joined the An:girasas (Va_yu 99, 198-201; Matsya 50, 5-7; Hv 32, 17814; Br 13,97; cf. Pargiter, p. 251). Mudgala's grandson was Vadhryas'va. Vadhryas'va's son was Divoda_sa.[cf. RV 10.69.2, 4, 9, 10; RV 8.103.2 which refer to Vadhryas'va and Divoda_sa]. Divoda_sa's successor was king Mitrayu. Mitrayu's son was Maitreya who joined he Bha_rgava vam.s'a. (Matsya 195,40). Pratadrana, son of Divoda_sa, was king of Ka_s'i and one of the authors of RV 10.179. Pratardana Daivoda_si, possibly a descendant of Divoda_sa, the king of North

Pa_n~ca_la, is the author of RV 9.96. Parucchepa Daivoda_si is mentioned as the author of RV 1.127 to 139); his son or descendant Ana_nata is the author if RV 9.96. Sumitra Va_dhryas'va is the author of RV 10.69 and 70 and a contemporary of King Cyavana Pijavana. (Pargiter, p. 251).

न्य् अक्रन्दयन्न् उपयन्त एनम् अमेहयन् वृषभम् मध्य आजेः ।

तेन सूभर्वं शतवत् सहस्रं गवाम् मुद्गलः प्रधने जिगाय ॥

10.102.05 Approaching the bull, they made him roar in the midst of the battle. I, Mudgala, havethereby gained in war hundreds and thousands of cattle well-pastured.

इमं तम् पश्य वृषभस्य युञ्जं काष्ठाया मध्ये द्रुघणं शयानम् ।

येन जिगाय शतवत् सहस्रं गवाम् मुद्गलः पृतनाज्येषु ॥

10.102.09 Behold this club, the ally of the bull, resting in the midst of the conflict, with which I,Mudgala, have won hundreds and thousands of cattle in war.

Suda_sa was a descendant of Divoda_sa. In r.ca 7.8.4, there is an indication by the r.s.i Vasis.t.ha Maitra_varun.i that Bharatas became victorious over Pu_ru. The battle took place on the banks of Parus.n.i, closen to Manasa lake (Haryana), west of Kuruks.etra and it is apparent that the Pu_rus had their territory from Parus.n.i (River Ravi) and Yamuna_.

प्रभप्रायम् अग्निर् भरतस्य शृण्वे वि यत् सूर्यो न रोचते बृहद् भाः ।

अभि यः पूरुम् पृतनासु तस्थौ द्युतानो दैव्यो अतिथिः शुशोच ॥

7.008.04 This Agni is greatly celebrated by the institutor of the rite when he shines resplendent as the sun; he who overcame Puru in battle, and shone glorious as the guest of the gods. [Is greatly celebrated: bharasya s'r.n.ve, yajama_nasya prathito bhavati; or, yajama_nasya a_hva_nam s'r.n.oti,he hears the invocation of the worshipper].

In r.cas RV 6.61.1 to 3, Divoda_sa is noted as the son of Vadhryas'va and as living on the banks of the RIver Sarasvati_. Hie enemies are: Pan.i, Pa_ra_vata and Br.saya. In the Har-ki-dun valley (from where the River Sarasvati originated from the Bandarpunch massif of the Himalayas in W. Garhwal), there live a people called 'parvatis' who celebrate Duryodhana as their god and hold an annual festival in his honour!

इ॒यम् अ॑ददाद् रभ॒सम् ऋ॑ण॒च्युतं॒ दिवो॑दासं वध्र्य॒श्वाय॑ दा॒शुषे॑ ।

या शश्व॑न्तम् आच॒खादा॑व॒सम् प॒णिं ता ते॑ दा॒त्राणि॑ तवि॒षा स॑रस्वति ॥

इ॒यं शुष्मे॑भिर् बिस॒खा इ॑वारुज॒त् सानु॑ गिरी॒णां त॑वि॒षेभि॑र् ऊ॒र्मिभि॑ः ।

पा॒रा॒व॒त॒घ्नीम् अव॑से सुवृ॒क्तिभि॒ः सर॑स्वती॒म् आ वि॑वासेम धी॒तिभि॑ः ॥

सर॑स्वति देव॒निदो॒ नि ब॑र्हय प्र॒जां विश्व॑स्य॒ बृस॑यस्य मा॒यिन॑ः ।

उ॒त क्षि॒तिभ्यो॑ ऽ॒वनीर् अविन्दो वि॒षम् ए॑भ्यो अस्रवो वाजिनीवति ॥

6.061.01 She gave to the donor of the oblations, Vadhryas'va, a son Divoda_sa endowed with speed, and acquitting the debt (due to gods and progenitors), she who destroyed the churlis niggard, (thinking) only of himself, such are your bounties, Sarasvati_. (Divoda_sa: Vis.n.u Pura_n.a makes the father of Divoda_sa, Bahvas'va but this is a representation of the nameBandhyas'va; the churlish niggard: Pan.i is the obvious reference].
6.061.02 With impetuous and mighty waves she breaks down the precipices of the mountains, like a digger for the lotus fibres; we adore for our protection, the praises and with sacred rites, Sarasvati_ the underminer of both her banks. [With impetuous and mighty waters: the firs r.ca addresses Sarasvati_ as a goddess; in this r.ca, she is praised as a river; in this entire su_kta, this alternative attribution is apparent; like a digger for the lotus-fibres: bisa-kha_ iva bisam khanati, who digs the bisa, the long fibres of the stem of the lotus, in delving for which he breaks down the banks of the pond].
6.061.03 Destroy, Sarasvati_, the revilers of the gods, the offspring of the universal deluder, Br.saya; giver of sustenance, you have acquired for men the lands (seized by the asuras), and have showered water upon them. [Br.saya: Br.saya is a name of Tvas.t.a_, whose son was Vr.tra; Sa_yan.a, provides a

legend in his introduction to the Black Taittiri_a Yajus., to illustrate te importance of correctly accentuating the words of the Veda: Indra, had killed a son of Tvas.t.a_, named Vis'varu_pa, in conseqence of which there was enmity between them. Upon the occasion of a Soma sacrifice celebrated by Tvas.t.a_, he omitted to include Indra in his invitation to the gods. Indra, however, came an uninvited guest, and by force took a part of the Soma libation. With the remainder Tvas.t.a_ performed a sacrifice for the birth of an individual who should avenge his quarrel and destroy his adversary, directing the priest to pray, now let a man be born and prosper, the killer of Indra. In uttering the mantra, however, the officiating priest made a mistake in the accentuation of the term indragha_taka, slayer of Indra, in which sense as a tatpurus.a compound, the acute accent should have been placed upon the last syllable. Instead of this, the reciter of the mantra placed the acent upon the first syllable, whereby the compound became a bahuvri_hi epithet, signifying one of whom Indra is the slayer. Consequently, wen by virtue of the rite, Vr.tra was produced, he was fore-doomed by the wrong accentuation to be put to death by Indra instead of becoming the destroyer. You have acquired for men: ks.itibhyo avani_ravindo vis.am abhyo asravah = you have shed poison upon them, or destroyed them].

[Alt. Hillebrandt, vol. 1, p. 341: "To the pious Vadhryas'va she gave the impetuous Dioda_sa, who redeems all debts. These mighty gifts come from you, O Sarasvati_, who consumed the obstinate, intractable Pan.i. Like one digging for roots, she violently broke through the ridge of the mountains with her mighty waves. With hymns and thoughts, let us invite the help of Sarasvati_, who slew the Pa_ra_vatas. Sarasvati_, cast you don the enemies of the gods, the progeny of every sly Br.saya. O you rich in horses, you gave the streams back to our abodes and made poison flow towards them." Hillebrandt notes hat the "expression praja_ vis'vasya br.sayasya requires that we interpret the word as the name of a tribe" and goes on to identify the Br.saya with the name of Barsaetes (Barzaentes) governor of Arachoti. (vol. 1, p. 343)].

Bharata

The r.ca RV 3.53.11 and 12 by r.s.i Vis'va_mitra Ga_thina refer to King Suda_sa and says that this prayer of Vis'va_mitra Ga_thina safeguards the Bha_rata folk. Suda_sa of the R.gveda was a king of North Pa_n~ca_la.

Bharata, was a great Paurava king. (Va_yu 99, 137-40; Matsya 49, 14-15; Hv 32, 1726-7; BR 13,58; Agni 277, 7-8; MBh 1,94,3710-12; loc.cit. Pargiter, p. 159). Bharata made an offering to the Maruts; they gave him Br.haspati's son Bharadva_ja as an adopted son. Bharadva_ja thus became a ks.atriya; Bharadva_ja's son Vitatha (Vidathin?) was consecrated as Bharata's successor. (Matsya 49, 27-34; Va_Yu 99, 152-8; Hv 32, 1727-31; Br 13, 59-61; loc.cit. Pargiter, p. 159).

R.jis'van was a descendant of Vidathin Bharadva_ja who descended from Us'ija. Hence, R.jis'van in r.ca RV 10.99.11 is called aus'ija or the son (or descendant) of Us'ija. R.jis'van is also called vaidathina, 'son or descendant of Vidathin' in RV 4.16.13).

Us'ija had three sons: "Chronological position: Ucatya (or Utathya), Br.haspati and Sam.varta; Ucathya's son Di_rghatamas by his wife Mamata_ and Br.haspati's son Bharadva_ja and descendant (probably great grandson) Vidathin Bharadva_ja. These rishis thus began in the country of Vais'a_li_, and moved westwards in time. Bharadva_ja moved to Ka_s'i_, and became purohita to king Divoda_sa II of Ka_s'i. Vidathin Bharadva_ja was adoped by king Bharata as his son, and the Bha_radva_jas remained connected with the Paurava dynasty....Bharadva_ja Ba_rhaspatya Vidathin, who was adopted by Bharata, is said to have had five sons, Suhotra, Sunahotra, Nara, Garga and R.jis'van, who were Bha_radva_jas and could claim optionally to be grandsons of Br.haspati or of Bharata....there were two Kaks.i_vants, both Aus'ijas, the first son of Di_rghatamas in Bharata's time and the second son (or descendant) of Pajra (and also probably a descendant of Di_rghatamas) soon after Divoda_sa." (Pargiter, pp. 220-221, 223).

अस्य स्तोमेभिर् औशिज ऋजिश्वा व्रजं दरयद् वृषभेण पिप्रोः ।

सुत्वा यद् यजतो दीदयद् गीः पुर इयानो अभि वर्पसा भूत्.

10.099.11 R.jis'va_, the son of Us'ija with Indra's praises shattered the cow pen of Pipru with the thunderbolt; when having expressed (the Soma), the venerable sage recited his praises, (Indra) proceeding against the cities (of the enemy) triumphed with his body.

उप॒ प्रेत॑ कुशिकाश् चे॒तय॑ध्व॒म् अश्वं॑ रा॒ये प्र मु॑ञ्चता सु॒दासः॑ ।

राजा॑ वृ॒त्रं ज॑ङ्घन॒त् प्राग् अपा॒ग् उद॒ग् अथा॑ यजाते॒ वर॒ आ पृ॑थि॒व्याः ॥

य इ॒मे रोद॑सी उ॒भे अ॒हम् इन्द्र॒म् अतु॑ष्टवम् ।

वि॒श्वामि॑त्रस्य रक्षति॒ ब्रह्मे॒दम् भार॑तं॒ जन॑म् ॥

3.053.11 Approach, Kus'ikas, the steed of Suda_s; animate (him), and let him loose to (win) riches (for the raja); for the king (of the gods) has slain Vr.tra in the East, in the West, in the North, therefore let (Suda_s) worship him in the best (regions) of the earth.
3.053.12 I have made Indra glorified by these two, heaven and earth, and this prayer of Vis'va_mitra protects the race of Bharata. [Made Indra glorified: indram atus.t.avam-- the verb is the third preterite of the casual, I have caused to be praised; it may mean: I praise Indra, abiding between heaven and earth, i.e. in the firmament].

Aitareya Bra_hman.a (7,3,5) and S'a_n:kha_yana S''rauta Su_tra (15,25) refer to Vis'va_mitra as Bharatar.s.abha, 'leader of the Bharata'. Suda_sa was a king of the North Pa_n~ca_la dynasty, which was descended from Ajami_d.ha and Bharata. (Pargiter, p. 100). Vis'va_mitra Ga_thina, a descendant of the r.s.i Vis'va_mitra, was the priest of Suda_sa as the r.ca shows.

Sa_yan.a notes that Vis'va_mitra was a descendant of Bharata, in his commentary on r.cas RV 3.53.13, 24:

वि॒श्वामि॑त्रा अरासत॒ ब्रह्मेन्द्रा॑य व॒ज्रिणे॑ ।

कर॒द् इन् नः॑ सु॒राध॑सः ॥

किं ते॑ कृण्वन्ति॒ कीक॑टेषु॒ गावो॒ नाशिरं॑ दु॒ह्रे न त॑पन्ति घ॒र्मम् ।

आ नो॑ भर॒ प्रम॑गन्दस्य॒ वेदो॑ नैचाशा॒खम् म॑घवन् रन्धया नः ॥

3.053.13 The Vis'va_mitras have addressed the prayer to Indra, the wielder of the thunderbolt; may he therefore render us very opulent. [The Vis'va_mitras:

The bharatas, or descendants of Bharata, are descendants of Vis'va_mitra; Bharata is the son of S'akuntala_, the daughter of the sage, Visva_mitra (Maha_bha_rata A_diparva); Vasis.t.ha is the family priest of the Bharats and was the restorer to dominion from which they had been expelled by the Pan~ca_las].
3.053.14 What do the cattle for you among the Ki_kat.as; they yield no milk to mix with the Soma, they need not the vessel (for the libation); bring them to us; (bring also) the wealth of the son of the usurer, and give us Maghavan, (the possessions) of the low branches (of the community). [The Ki_kat.as: (Nirukta 6.32) are people who do not perform worship, who are infidels, na_stikas; in countries inhabited by ana_ryas (ki_kat.a_ na_ma des'ona_ryaniva_sah); na tapanti gharma_n.i: harmyam = a house; gharma_n.i = a vessel termed maha_vi_ra used at the rite called pragr.hya: pragr.h ya_khya_ karmopa yuktam maha_vi_rapa_tram, which the cattle do not warm by yielding their milk to it; usurer: a_ bhara pramagandasya vedas: maganda = kusidin, or usurer, one who says to himself, the money that goes from me will come back doubled, and pra = a patronymic; low branches of the community: naica_s'a_kham, that which belongs to a low (ni_ca) branch, or class (s'a_kha); the posterity born of S'u_dras and the like].

इम इन्द्र भरतस्य पुत्रा अपपित्वं चिकितुर् न प्रपित्वम् ।

हिन्वन्त्य् अश्वम् अरणं न नित्यं ज्यावाजम् परि णयन्त्य् आजौ ॥

3.053.24 These sons of Bharata, Indra, understand severance (from the Vasis.t.has), not association (with them); they urge their steeds (against them) as against a constant foe; they bear a stout bow (for their destruction) in battle. [Sons of Bharata: descendants of Vis'va_mitra whose enmity to the lineage of Vasis.t.ha is here expressed; the enmity reportedly occurred on account of Vis'va_mitra's disciple the Ra_ja_ suda_s; Anukraman.ika_ states that Vasis.t.has hear not the inimical imprecations: antya abhis'aparthas ta vasis.t.adevas.in.yah na vasis.t.hah s'r.n.vanti; Niruktam: sa vasis.t.hadves.i_ r.k-aham ca kapis.thalo vasi.s.hah atas tana nirbravi_mi, this and the previous verse are inimical to the Vasis.t.has and he is of the race of Vasis.t.ha, of the Kapis.t.hala branch].

There are two renowned Bharatas who are mentioned in the R.gveda: Suda_sa and Divoda_sa. Both are noted as descendants of Bharata in RV 3.53. 9,11,12,24 and RV 6.16.19; the su_kta RV 3.53 is by Vis'va_mitra Ga_thina:

महाँ ऋषिर् देवजा देवजूतो ऽस्तभ्नात् सिन्धुम् अर्णवं नृचक्षाः ।
विश्वामित्रो यद् अवहत् सुदासम् अप्रियायत कुशिकेभिर् इन्द्रः ॥

3.053.09 The great r.s.i the generator of the gods, the attracted by the deities, the overlooker of the leaders (at holy rites), Vis'va_mitra attested the watery stream when he sacrificed for Suda_s; Indra, with the Kus'ikas was pleased. [The generator of the gods: devaja_h = the generator of radiances or energies, tejasa_m janayita_; arrested the watery stream: astabhna_t sindhum arn.avam: he is said to have stoped the current of the confluence of the vipa_s/a_ and s'utudri rivers; indra with the kus'ikas was pleased: apriyayata kus'ikebhir Indra = kus'ikagotrotpannair r.s.ibhih saha, with the r.s.is of the kus'ika lineage, or it might be rendered, pleased by the Kus'ikas].

उप प्रेत कुशिकाश् चेतयध्वम् अश्वं राये प्र मुञ्चता सुदासः ।
राजा वृत्रं जङ्घनत् प्राग् अपाग् उदग् अथा यजाते वर आ पृथिव्याः ॥
य इमे रोदसी उभे अहम् इन्द्रम् अतुष्टवम् ।
विश्वामित्रस्य रक्षति ब्रह्मेदम् भारतं जनम् ॥

3.053.11 Approach, Kus'ikas, the steed of Suda_s; animate (him), and let him loose to (win) riches (for the raja); for the king (of the gods) has slain Vr.tra in the East, in the West, in the North, therefore let (Suda_s) worship him in the best (regions) of the earth.

3.053.12 I have made Indra glorified by these two, heaven and earth, and this prayer of Vis'va_mitra protects the race of Bharata. [Made Indra glorified: indram atus.t.avam-- the verb is the third preterite of the casual, I have caused to be praised; it may mean: I praise Indra, abiding between heaven and earth, i.e. in the firmament].

Alt. trans. (Griffith): The r.s.i of RV su_kta 7.18 is vasis.t.ha maitra_varun.i; in the r.cas, RV 7.18.22,23, Suda_sa is named as the son of Paijavana and the grandson of Devavata.

द्वे नप्तुर् देववतः शते गोर् द्वा रथा वधूमन्ता सुदासः ।
अर्हन्न् अग्ने पैजवनस्य दानं होतेव सद्म पर्य् एमि रेभन् ॥
चत्वारो मा पैजवनस्य दानाः स्मद्दिष्टयः कृशनिनो निरेके ।
ऋज्रासो मा पृथिविष्ठाः सुदासस् तोकं तोकाय श्रवसे वहन्ति ॥

7.018.22 Praising the liberality of Suda_sa, the grandson of Devavata, the son of Paijavana, the donor of two hundred cows, and of two chariots with two wives, I, worthy (of the gift), circumambulate you, Agni, like the ministrant priest in the chamber (of sacrifice).
7.018.23 Four (horses), having golden trappings, going steadily on a difficult road, celebrated on the earth, the excellent and acceptable gifts (made) to me by Suda_sa, the son of Paijavana, bear me as a son (to obtain) food and progeny. [The excellent: smaddis.t.ayah, an epithet of as'vah: prasa'sta_tisarjana_ s'raddha_dida_na_n:gayukta_, being or having part of a donation made in the belief of presenting what is excellent].

Citing the r.ca 7.33.3 some poeople wrongly surmise that (Vasis.t.ha) came from across the Sindhu, i.e. from eastern Iran". Let us see the r.ca to see if this notation is valid:

एवेन् नु कं सिन्धुम् एभिस् ततारेवेन् नु कम् भेदम् एभिर् जघान ।
एवेन् नु कं दाशराज्ञे सुदासम् प्रावद् इन्द्रो ब्रह्मणा वो वसिष्ठाः ॥

7.033.03 In the same manner was he, (Suda_sa) enabled by them easily to cross the Sindhu river; in the same manner, through them he easily slew his foe; so in like manner, Vasis.t.has, through your prayers, did Indra defend Suda_sa in the war with the ten kings. [He easily slew his foe: bhedam jagha_na: bheda may

also be a proper name; in the war with ten kings: da_s'ara_jn~e = das'abhi_ ra_ja_bhih saha yuddhe.]

The crossing of the Sindhu river is clearly a reference to the crossing of the river Beas (a tributary of the Sindhu) after the battle on the Yamuna with Bheda. As in many other r.cas, the word, 'sindhu' may simply refer to a 'stream'. **It is notable that NO archaeological sites have been found on the right bank of the River Parus.n.i. The famous site of Harappa is on the left bank of River Parus.n.i (River Ravi).**

The battle with Bheda is chronicled in RV 7.18.9 and is held on the banks of the Yamuna and may precede the next battle at Parus.n.i.

आवद् इन्द्रं यमुना तृत्सवश् च प्रात्र भेदं सर्वताता मुषायत् ।
अजासश् च शिग्रवो यक्षवश् च बलिं शीर्षाणि जभ्रुर्
अश्व्यानि ॥

7.018.19 The dwellers on the Yamuna and the Tr.tsus glorified Indra when he killed Bheda in battle; the Ajas, the S'igrus, the Yaks.as, offered him as a sacrifice the heads of the horses (killed in the combat). [Offered to him: balim s'i_rs.a_n.i jabhrur as'vya_ni : they represented the best horses, taken; bali may also have the import of a sacrifice].

The Avestan tradition remembers Vasis.t.ha as Vahis'ta.

The r.ca RV 7.33.9 does NOT refer to Yama (Iranian Yima) as the first man.

त इन् निण्यं हृदयस्य प्रकेतैः सहस्रवल्शम् अभि सं चरन्ति ।
यमेन ततम् परिधिं वयन्तो ऽप्सरस उप सेदुर् वसिष्ठाः ॥

7.033.09 By the wisdom seated in the heart the Vasis.t.has traverse the hidden thousand branched world, and the Apsarasas sit down wearing the vesture spread out by Yama. [The hidden thousand-branched world:nin.yam sahasravals'am abhisan~caranti, they completely go over the hidden, tirohitam,

or durjn~a_nam, ignorant, sahasra vals'am, thousand-branched, that is, sam.sa_ram, the revolving world of various living beings, or the succession of many births; the allusion is to the repeated births of Vasis.t.ha, who is the first of the Praja_patis, or mind-born sons of Brahma_, who is the son of Urvas'i_; hr.dayasya praketaih prajn~a_naih, internal convictions or knowledge; this may imply the detachment of Vasis.t.ha or his sons from the world. The apsaras sit down: yamena tatam paridhim vayanto apsarasa upasedur vasis.t.ha_h: te vasis.tha_h, those vasis.t.has or that vasis.t.ha; yamena = sarvaniyantra_, by the restrainer or regulator of all; ka_ran.a_tmana_, identical with cause, that is, by acts, as the causes of vital condition; the garb paridhim, vastram, spread, tatam, by him, is he revolution of life and death; janma_diprava_ha_h, weavin, vayantah; connecting this with apsarasah, the myphs, or, the nymph Urvas'i_, who sat down or approached in the capacity of a mother, jananitvena, wearing that vesture which he was destined by former nets to wear].

> **The r.ca RV 7.33.3 does NOT say that the direction of crossing of the river Sindhu was from west to east [or north to south]. It is only a conjecture to state that the crossing was from eastern Iran.**
>
> Just because Vasis.t.ha's descendants claim to be.An:giras (RV 7.42.1 and 7.52.3), there is no basis for a conjecture about the locale of An:giras being eastern Iran.

S'Br (12.6.1.41) notes that Vasis.t.has are th priests of Tr.tsu-Bharatas. Ludwig considers that the Tr.tsus and Bharatas are one and the same clan. (Ludwig, III, p. 185; *Buddha*, 1st ed., p. 413). Oldenberg (ZDMG, XLII, p. 207) notes that Tr.tsu may be identical with the Vasis.t.has who are the priests of the Bharatas.

Sa_yan.a interprets the r.ca 7.33.6 equating Tr.tsu with the Bharata:

द॒ण्डा इ॒वेद् गो॒अज॑नास आ॒स॒न् परि॑च्छिन्ना भ॒रता अ॑र्भ॒कासः॑ ।
अभ॑वच् च पु॒रता वसि॑ष्ठ॒ आद् इत् तृत्सू॑ना॒ं विशो॑ अप्रथन्त ॥

7.033.06 The Bharatas, inferior (to their foes), were shorn (of their possessions), like he staves for driving cattle, (stripped of their leaves and

branches); but Vasis.t.ha became their family priest, and the people of the Tr.tsus prospered. [People of the Tr.tsus: Tr.tsus are the same as the Bharatas.]

[In this r.ca, Bloomfield, Contributions, V -- JAOS, XVI, p. 41 sees the account of a battle between the Bharatas (ks.atriya) and the Tr.tsu's with Vasis.s.t.ha (brahman). Hillebrandt (vol. 1, 350) notes: "In this verse tr.tsu_na_m and bharata_H can hardly be identical; one would not understand the transferance of the names, much less can one call priests 'the regions of the Tr.tsus'. The difficulties seem to disappear when we regard Suda_s as an invader marching in the vanguard of the Bharatas, whom for some reason or other the Tr.tsus headed by the Vasis.t.has supported in his troubles and helped in his conquests. In the kingdom of Suda_s the two tribes merged together,and the Vasis.t.has became his singers."]

The alternative explanation offered by Sa_yan.a is consistent with the legend about Sam.varan.a, the son of R.ks.a, the fourth in descent from Bharata (the son of Dus.yanta), who was driven from his kingdom by the Pan~ca_las, and obliged to take refuge with his tribe among the thickets on the Sindhu until Vasis.t.ha came to them and consented to be the ra_ja_'s purohit, when they recovered their territory. Vasis.t.ha, the leader of the priestly clan of Tr.tsus might have crossed from the kingdom of the Pan~ca_las and Suda_sa helped him cross the Sindhu. There is no need to surmise as Hillebrandt does about an invasion by Suda_sa across the River Sindhu.

त्वद् भिया विश आयन्न् असिक्नीर् असमना जहतीर् भोजनानि ।
वैश्वानर पूरवे शोशुचानः पुरो यद् अग्ने दरयन्न् अदीदेः ॥

7.005.03 Through fear of you, Vais'va_nara, the dark-complexioned races, although of many minds, arrived, abandoning their possessions, when, Agni, shining upon Puru, you have blazed, consuming the cities of his foe. [Puru: In RV. 1.67.3, Purave occurs as an epithet of Suda_sa, one who fills or satisfies with offerings].

त्वे असुर्यं वसवो न्य् ऋण्वन् क्रतुं हि ते मित्रमहो जुषन्त ।
त्वं दस्यूँरोकसो अग्न आज उरु ज्योतिर् जनयन्न् आर्याय ॥

7.005.06 Reverencer of friends, Agni, th Vasus have concentrated vigour in you; theyhave been propitiated by your acts; generating vast splendour for the Arya, do you,Agni, expel the Dasyus from the dwelling.

[There is nothing in these two r.cas RV 7.5.3,6 to reflect that (Bharatas and Vasis..ha's) moved into Bharat. This is simply an explanation of the dislodgement of dasyu].

The other r.cas which contain a reference to bharata or bha_rata are presented below; in many references, the term 'bharata' is interpreted as a 'bearer' (of oblations) or as a 'priest' or R.tvik as a bearer of materials for the yajn~a:

तम् ईळत प्रथमं यज्ञसाधं विश आरीर् आहुतम् ऋञ्जसानम् ।

ऊर्जः पुत्रम् भरतं सृप्रदानुं देवा अग्निं धारयन् द्रविणोदाम् ॥

1.096.03 Approaching him,let all men adore Agni, the chief (of the gods), the accomplisher of sacrifices, who is gratified by oblations and propitiated by praises--the offspring of food, the sustainer of (all men), the giver of continual gifts; the gods retain Agni as the giver of (sacrificial) wealth.[prathama = lit. the first; here, mukya, chief (of the gods)].

श्रेष्ठं यविष्ठ भारताग्ने द्युमन्तम् आ भर ।

वसो पुरुस्पृहं रयिम् ॥

2.007.01 Youngest (of the gods), Agni descendant of Bha_rata, granter of dwellings, bring (to us) excellent, splendid and enviable riches. [Descendant of Bha_rata: Bha_rata = sprung from the priests; bharata = r.tvija, produced by their rubbing the sticks together].

त्वं नो असि भारताग्ने वशाभिर् उक्षभिः ।

अष्टापदीभिर् आहुतः ॥

2.007.05 Agni, descendantof Bharata_, you are entirely ours, when sacrificed to with pregnant kine, with barren cows, or bulls. [When sacrificed to with: vas'a_bhir uks.abhih as.t.a_padi_bhira_hutah, offered or sacrificed to with barren cows, vas'a_; will bulls, uks.a, and with eight-footed animals, i.e. a cow with calf; it is remarkable that these animals should be sprung of a burnt-offering].

यज्ञैः सम्मिश्लाः पृषतीभिर् ऋष्टिभिर् यामञ् छुभ्रासो अञ्जिषु प्रिया उत ।
आसद्या बर्हिर् भरतस्य सूनवः पोत्राद् आ सोमम् पिबता दिवो नरः ॥

2.036.02 Maruts, together worshipped with sacrifices, standing in the car drawn by spotted mares, radiant with lances, and delighted by ornaments, sons of Bharata, leaders in the firmament, seated on the sacred grass, drink the Soma presented by the Pota_. [Sons of Bharata: bharatasyasu_navah, the first is said to be a name of Rudra, as the cherisher or sovereign, bharta_, of theworld].

यद् अङ्ग त्वा भरताः संतरेयुर् गव्यन् ग्राम इषित इन्द्रजूतः ।
अर्षाद् अह प्रसवः सर्गतक्त आ वो वृणे सुमतिं यज्ञियानाम् ॥

3.033.11 Vis'va_mitra speaks: (Since), rivers, (you have allowed me to cross), so may the Bharatas pass over (your united stream); may the troop desiring to cross the water, permitted (by you), and impelled by Indra, pass; then let the course appointed for your going (be resumed); I have recourse to the favour of you who are worthy of adoration. [The Bharatas: said to be the same lineage as Vis'va_mitra's: bharatakulaja_ madiya_h sarve; perhaps this means, those who were the bearers of Vis'va_mitra's goods and chattels; Maha_bha_rata, A_di Parva 5.3734 cites Vasis.t.ha as the family priest of the Bharatas].

अतारिषुर् भरता गव्यवः सम् अभक्त विप्रः सुमतिं नदीनाम् ।
प्र पिन्वध्वम् इषयन्तीः सुराधा आ वक्षणाः पृणध्वं यात शीभम् ॥

3.033.12 The Bharata_s seeking cattle passed over; the sage enjoyed the favour of the rivers; streams dispensing food, productive of wealth, spread abundance, fill (your beds), flow swiftly.

तस्मा अग्निर् भारतः शर्म यंसज् ज्योक् पश्यात् सूर्यम् उच्चरन्तम् ।
य इन्द्राय सुनवामेत्य् आह नरे नर्याय नृतमाय नृणाम् ॥

4.025.04 May Agni, the bearer of oblations, grant him felicity, and long behold the rising sun (in the dwelling of him) who says, let us offer libations to Indra, leader (of rites) the friend of man, the chief leader among leaders. [And long behold the rising sun: i.e., may the sacred fire long be hindled in the house of the sacrificer at the hour of sunrise].

जनस्य गोपा अजनिष्ट जागृविर् अग्निः सुदक्षः सुविताय नव्यसे ।
घृतप्रतीको बृहता दिविस्पृशा द्युमद् वि भाति भरतेभ्यः शुचिः ॥

5.011.01 The vigilant, the powerful Agni, the protector of man, has been engendered for the present prosperity (of the world); fed with butter, (blazing) with intense (radiance) reaching to the sky, the pure Agni shines brilliantly for the Bharatas. [Yajus. 15.27; Bharatas = R.tviks, or priests; alternative rendering: Agni has been engendered by the priests for the present sacrifice; he shines so brilliantly that with his flames he touches the sky, the patron of the sacrificer, vigilant, dexterous, fed with butter, pure].

यूयं रयिम् मरुत स्पार्हवीरं यूयम् ऋषिम् अवथ सामविप्रम् ।
यूयम् अर्वन्तम् भरताय वाजं यूयं धत्थ राजानं श्रुष्टिमन्तम् ॥

5.054.14 You bestow, Maruts, wealth and enviable posterity; you protect the sage learned in theSa_ma; you grant horses and food to (me) the ministrant priest; you render a prince prosperous. [The sage learned in the Sa_ma: sa_mavipram = samna_m vividha_m prerayita_ram, the prompt or instigator, in various ways, of the Sa_ma hymns].

उद् अंग्ने भारत द्युमद् अजंस्रेण दविंद्युतत् ।
शोचा वि भांह्य् अजर ॥

6.016.45 Blaze up, Agni, bearer of oblations; shine, undecaying Agni, radiant with undecaying lustre.

Ancient movements of people out of Bharat

The search for minerals took the enterprising miners and traders of Bharat, ca. 4th and 3rd millennia BP, far beyond the sources of the Tigris and Euphrates rivers even into northern Europe. This is evidenced by the tin ingots found in a shipwreck in Haifa, Israel and by the remarkable find of the Gundestrop cauldron in a bog in northern Europe, with emphatic pictorial motifs which parallel the archaeological finds of the Sarasvati Civilization.

'One of the startling discoveries at Surkotada has been horse bones which have refuted the earlier belief that the use of the horse was unknown to the Harappans.' (F.Chakravarty, 1974, New Light on Harappans, *The Sunday Standard*, Madras, August 25, 1974, Magazine Section, p.1, col.2).

'But now the controversy is set entirely at rest by the excavations carried out in 1965, 1967 and 1968 under JP Joshi at Harappa_n Surkotada in Kutch. ('Exploration in Kutch and Excavation at Surkotada and New Light on Harappan Migration', *Journal of the Oriental Institute*, MSS Univerisity of Baroda, Vol. XII, Sept-Dec. 1972, Nos. 1-2, pp. 135-138, 136). For among the animals 'which were either domesticated or were in the process of domestication', the excavators discovered not only the 'ass (Equus onager indicus)' but also the 'horse (Equus caballus Linn.)'. Joshi writes: 'The Harappans of Surkotada knew Equus right from the time of their arrival at Surkotada.'He also tells us: 'A lot of equine bones right from earlier to top levels have been recovered. A majority of them are phalanges and teeth.' Thus the possession of horses by the Gandha_ra Grave Culture cannot distinguish the people of it uniquely as Aryan invaders. They might easily be Indian borderlanders on the move.' (K.D. Sethna, 1992, *The Problems of Aryan Origins: From an Indian Point of View*, Second Extensively enlarged edition with five supplements, Delhi, Aditya Prakashan, p. 9).

“One more step in the scheme of interrelated Aryanism can be taken and it is the one most pertinent to our context. Anau and Sialk no less than RG are sites where bones of the domesticated horse are said to have been found in veryh early times. At Shah Tepe on the shore of the Caspian Sea in Iran's extreme northp-west, a little to the south-west of Anau, similar remains in more less the same period have been claimed...

"...the total equation of the Anau equine with the onager may be controverted by a reductio adabsurdum with the help of the recent opinion on the equines from the ancient Indus Valley. (*Proceedings of the First All-India Congress of Zoology*, Calcutta, 1959, part 2, Scientific Papers, pp. 1-14). Lately some bones were found in Area G., Harappa_, which are said to belong not to the period proper of the Harappa_ Culture (c. 2500-1500 BC) but to the post-Harappa_ civilization. The earlier find by Sewell and Guha (1931) at Mohenjo-da_ro is also reported to have been from an upper level. So one does not know whether it too is part of the Indus Valley Civilization. But from the scientific account "it is evident that the Equid skeletan remains from Area G., Harappa_, belong to the true horse, E. caballus Linn., and not to the onager group; they resemble the modern country-bred' horses of India". The writer goes on to include among the skeletan remains of the true horse' those from an upper level of Mohenjo-da_ro. But then what shall we make of Frederick Zeuner's pronouncement: "...the few boines found at Mohenjo-da_ro, which Sewell (1931) compared with the Anau horse, are likely to belong to the Indian onagers"? (1963, *A History of Domestic Animals*, London, Hutchinson, p.371) ...the case of the domesticated Anau horse (c. 4000 BC) -- Lundholm notwithstanding -- proves very sound indeed. The case for the Sialk find from Level II is even more sound. This find comprises two molars assigned by Vaufreyy to the Pumpelly horse. Zeuner dismisses briefly the equines concerned: "These equines, being identified with the Anau form, have now to be regarded as half-asses also." (ibid., p. 316)...

" There is Susa in ancient Elam, where between Levels I and II, which means the beginning of the third millennium BC, an engraving on a bone depicts in a diagrammatic form a rider on an equine that, unlike an ass, has short ears and, unlike an onager, an untasselled tail and is consequently a horse, as Amschler long ago pointed out... A picture in Zeuner, the War Panel of the Standard of Ur (c. 2500 BC), sets forth onagers drawing chariots. (ibid., p. 272, Fig. 14: 6). The mane in the first register here is no more upright than that of an Egyptian

chariot-drawing horse whose picture from the Tomb of CHaemhet of the 18th dynasty (c. 1500 BC) is reproduced by Zeuner. (ibid., p. 321, Fig. 12: 13)...When referring to Susa, Zeuner forgerts the bone-engraving of an equine without a rider. R. Ghirshman gives a reproduction of it with the title: 'Przewalski horse carved in bone." (1954, *Ira_n*, A Pelican Book, Harmondsworth, 1954, p. 35, Fig. 8). The animal carved may be a tarpan for all we know or a cross, but its mane is just the sort which inclines Zeuner to "discard the Khafaje vase as an early representation of an onager."..From north of Kish in Mesopotamia comes an ideogram of the horse on a tablet. It is called "the ass of the mountains". Langdon dates it prior to 3500 BC, which is too early in Zeuner's opinion. (op.cit., p. 317). Gordon Childe ascribes it to Jamdat Nasr times (c. 3000 BC) (1934, New Lights on the Most Ancient East, London, Routledge, p. 161)...Piggott points to the provenance of "the ass of the mountains" when he says that it was no native of Mesopotamia and must have hailed from the hilly tracts of Persia and from Turkesta_n. (opcit, p. 158). However, Turkesta_n, Highland Persia, Balu_chista_n and the vicinity of the Caspian Sea are not the only homes of the domesticated horse. There is the Ukraine in the South-east Europe. Zeuner himself has written of the Tripolye Culture and its several phases...More recently E.D. Philips has said apropos of the chronology c. 3000-1700 BC: "...the earlier date is rather hypothetical but is supported by recent C 14 tests...The bones of horses occur at all levels, and the tame horses of this culture are probably the earliest in history." (1961, 'The Nomad Peoples of the Steppes'. *The Dawn of Civilization*, edited by Stuart Piggott, London, Thames and Hudson, 2nd impression, p. 318, col.1)...

"We cannot consider the Rigvedic part as the original centre of Aryanism. No ground exists, on available evidence to take it to be the sole seat of Aryan settlement in the age we have attributed to it, namely, 3500 to 3000 BC -- just as on the other hand no ground exists to give the Rigvedics an extra-Indian origin in any calculable past." (K.D. Sethna, 1992, *The Problems of Aryan Origins: From an Indian Point of View*, Second Extensively enlarged edition with five supplements, Delhi, Aditya Prakashan, pp. 67-76).

Gundestrup Cauldron

In the Indian tradition, kol.el, the smithy is the temple (Kota language). In Tod.a language, kwala.l, refers to a Kota smithy.

Kolmi, smithy is the continuing legacy of the Sarasvati Sindhu Civilization, which dates back to ca. 3500 BC, evolving on the banks of the Rivers Sarasvati and Sindhu. As the bronzes became utsava be_ra, the mu_rti (representations), were also made by the artisans, to carry weapons and armour, celebrating the civilization -- an industrial culture -- which emerged during the bronze age in Bharat.

Even today, in the temple city of Swa_mimalai (near Kumbakon.am, Tamilnadu), celebrates the bronze-workers who sculpt equisite utsava be_ra, using pan~ca-loha (or five metals); their deity is e_raka subrahman.ya, i.e., ka_rttike_ya. [ere = a dark-red or dark-brown colour (Kannad.a); eruvai = copper (Tamil) erkem = billhook (Go.)(DEDR 824)].

This extraordinary legacy which is the very quintessence of Indian cultural, philological and religious continuity, for over 5 millennia, is the resource to unravel the keys which will help decipher the script of the civilization. One of the vivid images of the Gundestrup cauldron is the seated person holding a snake in his left hand. The 'snake' pictograph is equally vivid on the inscribed objects of the Indian civilization. While browsing a number of 'pictographs' on inscribed objects and attemptintg to match the 'pictographs' with 'sound-bites' drawn from the lexemes of Indian civilization (Vedic, Mun.d.a and Dravidian languages -- of the extensive linguistic area), an assumption was made that the inscriptions 'convey' metal weapons, tools and equipment of a warrior -- either as property items possessed by the holder of the object or as bills of lading of these products traded. [See Indian Civilization: inscriptions and pictorials depicting battle- weapons and tools]

Some of the images on the Gundestrup cauldron, almost all of which have parallels on many inscribed objects of Indian civilization (ca. 3500 to 1500 BC) will be evaluated further in archaeo-philological terms.

Gundestrup cauldron was found in a bog near Gundestrup, Denmark. See photos of the bodies found in the bog: http://jamesmdeem.com/bogphotos.htm
Dutch early and middle Bronze age pictures:
http://www.angelfire.com/me/ik/pics.html

The cauldron is forged and made of silver (96%) and consists of seven outer plates, five inner plates, and separate rim and base pieces. It is decorated with Celtic and exotic imagery using repousse and engraving techniques. Recent study has determined that no less than five crafts-workers worked on it, all using different tools for the moulding, engraving and assembly of the cauldron. It was not from Denmark originally, but probably made in the south-east of Europe for a Celtic clientele. http://www.celtic-cauldron.com/

Its typical Celtic decorations include an elephant.

One of the panels with a figure having upraised arms on the Gundestrup Cauldron is accompanied by the wheel.

"A romanized, female face with empty eyes (once filled with inlaid glass) and a buffer ended torc is flanked on each side by ox-heads. Two wild beasts flanking a triskele are found on the inner plate. Possibly made by more than one person, the symbolism is Celtic and it probably made its way to Denmark via trade or the warlike wanderings of the Cimbri. The torc is of a type that was current in France in the last years of the 1st century BC or the early years AD.The most famous cauldron is, of course, the Gundestrap Cauldron whuch was found, dismantled, on the surface of a peat-bog in northern Jutland. With a combined weight of almost 9kg, five internal plaques, a basal disc, and seven out of eight square external plates survived. Recent study has shown that the plates were made by several different artists, perhaps by 2nd century Thracians.

"Some of the iconography is Celtic: a cross-legged, antlered god, wearing a torc and holding another in his hand; warriors with helmets crested with boars or birds of prey; animal-headed war trumpets; circular harness mounts; shield-bosses of the Late La Tene type. Celtic dogs, wolves and bulls are seen, but so are more exotic animals - lions, dragons/griffons, elephants, and even a boy on a dolphin...

"Processions of warriors, a squatting god with antlers and holding a snake and a torc, passively standing lions, ibex, griffons, elephants and leopards are some of the images found on the side plates of the cauldron. An oversized figure holding another, smaller, figure upside-down over a cauldron has been interpreted as possibly a god of war offering sacrifice or as a representation of

the bringing a dead hero back to life by immersing the body in the 'cauldron of plenty'." **Celtic Art - A Brief Overview** by Tara NicScothach bean MacAnTsaoir http://clannada.org/docs/art.html

Copenhagen,Nationalmuseet The Gundestrup Cauldron discovered in 1891

"It was beaten out of 10 kg of silver, probably in the second century BC, constructed from 13 heavily decorated rectangular panels and a plain bowl containing a 14th circular one (possibly a late addition). The entire assembly is 70 cm in diameter. Sometime around the birth of Christ it was taken to pieces and apparently just left on the ground in a bog near what is now the hamlet of Gundestrup in Northern Jutland, where it gradually became overgrown and covered with peat. It remained there until its discovery by peat cutters in 1891. The eight external panels (of which one is missing) each feature what appears to be the single face of a different god or goddess, surrounded by much smaller humanoids or beasts. The five interior panels each depict many characters, men, women, gods and beasts, in what may be a story."

"Hindu Deities in Iron Age Denmark: The Religious Iconography and Ritual Context of the Gundestrup Cauldron.

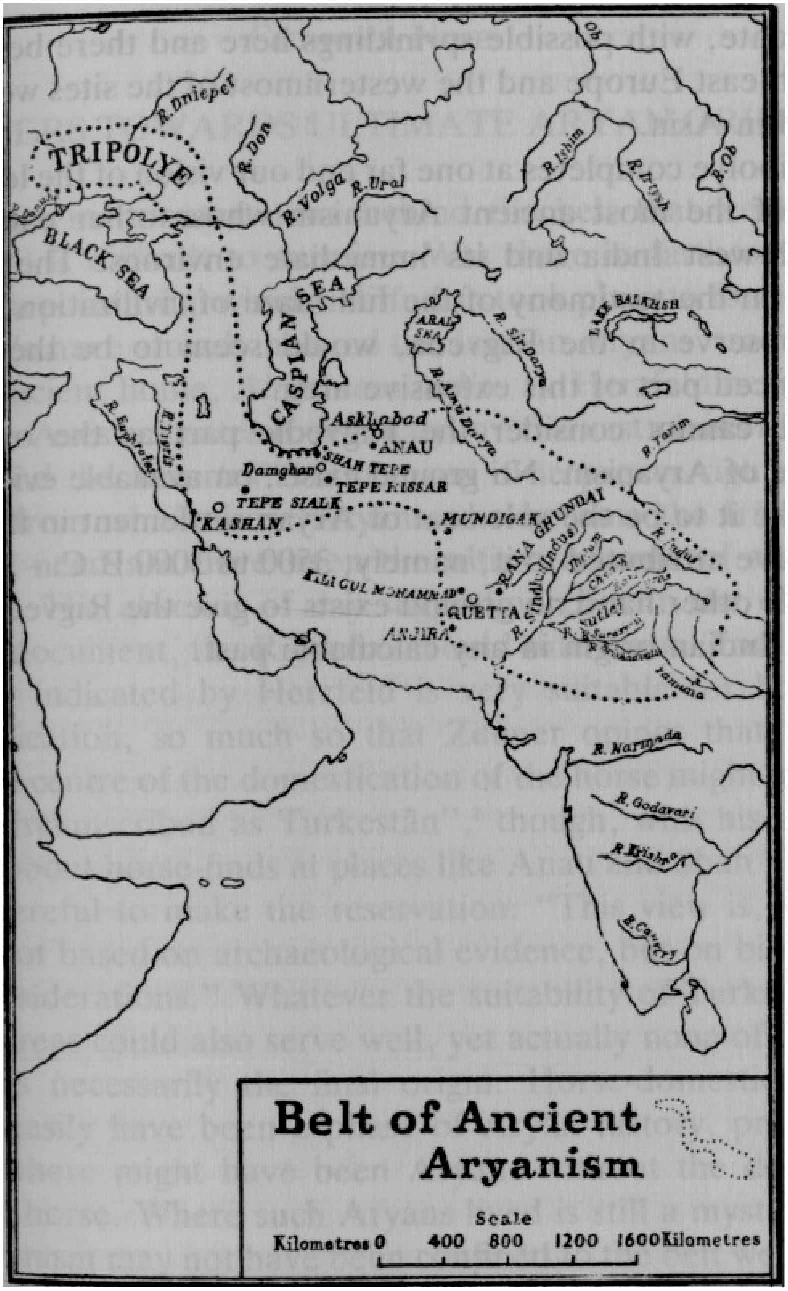
"This paper considers aspects of the second century BC iconography of the Gundestrup cauldron in relation to the idea of death in various frameworks of thought and belief: Shamanistic, Mithraic, Pythagorean, Hindu, Celtic, Orphic, and Christian. Following from this, some general theoretical considerations about the relationship of iconographic, ritual,
textual, and oral religious modes are presented. In the light of this, a precise context for the cauldron's production and use is suggested. [Dr. Tim Taylor (University of Bradford). Univ. of Birmingham, Archaeology and World

Religions, Session held on 19 December 1998]. "
http://www.bham.ac.uk/TAG98/pages/abs

Kernunnos or Cernunnos is a solar god in Celtic art, and was perhaps influenced by art from Indian civilization. Kernunos is depicted on the Gundestrup cauldron sitting in a Yoga position. Many imageries of the Gundestgrop cauldron depicting Kernunnos surrounded by animals and snake, are paralleled in the inscribed objects of Indian civilization as demonstrated in the following two tables.

The horned god and the warrior goddess: comparing imageries

Bharata's region of influence



Dr. Sethna surmisea a possible region of influence from Bharat, as depicted on a map, in what he calls the belt of ancient Aryanism.
[After K.D. Sethna, 1992, *The Problems of Aryan Origins: From an Indian Point of View*, Second Extensively enlarged edition with five supplements, Delhi, Aditya Prakashan, Page 75; this map identifies a belt of ancient Aryanism which would go back in time to ca. 4000 BC and would have a fairly developed individuality in ca. 3500-3000 BC. Its most advanced centre would be constituted by the Rigvedic Civilization in North-west India. Its principal sites outside the region would be Kili Ghul Mohammad and Ra_na_ Ghunda_i_ in North Balu_chista_n, Anjira in upper South Balu_chista_n, Mundiga_k in South A_fghanista_n, Anau in Russian Turkesta_n, Shah Tepe, Hissar and Sialk in Ira_n and Tripolye in the Ukraine.]

We may hypothesise that this also connoted the nature of the interactions which took place between the people of the Sarasvati Civilization and neighbouring regions, with particular reference to the search for and trade in minerals and metals, arms and armour.

"The Maryanni of the Upper Euphrates, emerging into history in ca. 1460 BC, certainly appear to stem from a Rigvedic source. So also do the ruling aristocrats among the Kassites who set up by 1741 BC a dynasty in Babylon which lasted for 576 years: they bore names with components recalling Rigvedic deities -- Suriash (sun-god, cf. Sanskrit Su_rya), Indas (cf. Sanskrit Indra), Maruttash (cf. Sanskrit Marutah, storm-gods), and are said to have had even the word Shimalia (Himalaya) meaning 'queen of the mountains'...they are very much later than this scripture (Rigveda) as dated by us. An in the meantime -- from the fourth millennium BC onward into the third and second -- there was, as attested by the enormous post-Rigvedic literature, a passage out of the Indus Valley and an exploration of various parts of India eastward and southward....Archaeologists -- e.g. Pigott (1961, Prehistoric India, Penguin, Harmondsworth, pp. 58, 65, 75) -- have found that pottery-styles in prehistoric times link in diverse ways Turkesta_n's Anau with Sialk, Ra_na_ Ghunda_i_ with Anau, Sialk and Ra_na_ Ghunda_i_. Piggott has also noted about Hissar and RG: "The animals depicted on the pots of the two regions -- North Persia and North Baluchista_n -- differ, presumably in response to the fauna and the differing types of domesticated beast in the two cultures, but apart from this the similarities are so striking that we can claim Hissar I and RG II as paralle developments within the Red-ware area." (ibid., pp. 129-30)...We should join to them Mundigak in South Afghanista_n, about whose pottery Fairservis, Jr.,

has the general statement: "...the Mundigak sequence is closely paralleled in northern Baluchista_n -- so much so, in fact, that one can say that they are essentially of one and the same tradition." (1971, The Roots of Ancient India, London, Allen and Un win, p. 134). Bridget and Raymond Allchin inform us about the early phase of Mundigak I: "Some characteristic painted designs are similar to those of Kili Ghal Mohammad II (north Balu_chista_n) and Anjira I (upper south Balu_chista_n)." (1969, *The Birth of Indian Civilization*, Penguin, Harmondsworth, p. 104)...

Sites in India and West Asia where inscriptions (dated ca. 5,500 to 3,500 BP) were discovered

[According to the R.gveda, most people were settled in small communities, located along the river banks. A gazetteer of ancient archaeological sites of the 'Indus Age', about 2,600 sites is provided in Appendix-A of G.L. Possehl, 2000, *Indus Age: the Beginnings*, Delhi, Oxford and IBH, pp. 727-845].

[Abbreviations of place names are prefixed to the reference numbers in the Corpus of Inscriptions (Parpola) West Asian sites where inscriptions were found are: Djoka (Umma), Kish, Susa, Telloh and Ur].

Principal Locality Index: Archaeological Settlements, mostly in Sarasvati River Basin

Localities of relatively larger size –about 15 ha. In extent (as per the Gazetteer of Gregory L. Possehl, 2000, opcit.)

Adhi One (Bahawalpur) 28*46'04"N 71*05'03"E
Ahmad Khan's (Jaisalmer) 27*54'00"N 70*24'00"E
Ambrawali (Bahawalpur) 28*47'27"N 71*48'05"E
Azimwali (Bahawalpur) 28*47'33"N 71*11'40"E
Baglianda Theh (Bhatinda) 29*56'00"N 75*29'00"E
Banawali (Hissar) 29*36'25"N 75*23'55"E
Bare Two (Bhatinda) 29*55'00"N 75*28'00"E
Bara (Ropar) 30*54'00"N 76*30'00"E
Bet Dwarka (Jamnagar) 22*20'00"N 69*05'00"E
Bhagatrav (Broach) 21*29'00"N 72*42'00"E
Bhootanwala (Bahawalpur) 28*46'05"N 71*03'10'E
Budhel (Bhavnagar) 21*45'00"N 72*09'00"E
Butewala (Bahawalpur) 28*55'10"N 71*05'56"e
Chabbuwala (Bahawalpur) 29*09'00"N 71*54'00"E
Chak 121 A (Rahimyar Khan) 28*24'40"N 70*36'10"E
Chak 341 (Bahawalpur) 29*10'27"N 72*17'53"E
Chambrawala Ther (Bahawalpur) 29*20'00"N 72*18'00E
Chandnewala Two (Bahawalpur) 28*44'10"N 71*12'25"E
Chikrala (Bahawalpur) 28*45'05"N 71*12'02"E
Chore (Bahawalpur) 28*45'36'N 71*09'30"E
Dabar Kot (Loralai) 30*0500"N 68*41'00"E

Daidungri (Rajkot) 22*00'00"N 71*05'00"E
Daimabad (Ahmednagar) 19*31'00"N 74*42'00"E
Dalliwala One (Bhatinda) 29*49'00"N 75*25'00"E
Dalliwala Two (Bhatinda) 29*50'00"N 75*25'00"E
Datrana Eight (Banaskantha) 23*46'00"N 71*06'45"E
Derawara Ther (Bahawalpur) 28*46'15"N 71*19'40"E
Devalio (Surendranagar) 22*25'00"N 71*55'00"E
Develiwala (Bahawalpur) 28*40'45"N 71*02'00"E
Dewaliana Ther (Bahawalpur) 28*45'00"N 71*26'00"E
Dhalewan (Bhatinda) 30*02'00"N 75*33'00"E
Dholavira (Kutch) 23*53'10"N 70*13'00"E
Dwarka (Jamnagar) 22*13'00"N 69*00'00"E
Edith Shahr (Las Bela) 26*23'00"N 66*20'00"E
Gajjuwala Two (Bahawalpur) 28*50'20"N 71*07'06"E
Gamanwala (Bahawalpur) 29*11'09"N 72*22'56"E
Gamuwala Ther (Bahawalpur) 28*47'13"N 71*06'44"E
Ganweriwala (Bahawalpur) 28*35'56"N 71*09'00"E
Gopawala (Bahawalnagar) 28*53'55"N 71*17'52"E
Gurnikalan One (Bhatinda) 29*50'00"N 75*33'00"E
Gurnikalan Two (Bhatinda) 29*50'00"N 75*33'00"E
Harappa (Sahiwal) 30*38'00"N 72*52'00"E
Hasanpur Two (Bhatinda) 29*59'00"N 75*33'00"E
Hirke (Bhatinda) 29*44'00"N 75*22'00"E
Jalwali (Bahawalpur) 29*14'21"N 72*11'39"E
Jhalar (Bahawalpur) 28*42'45"N 71*07'10"E
Judeijo-daro (Kachi) 29*25'08"N 76*45'28"E
Karanpura (Bhatinda) 29*52'00"N 75*23'00"E
Kerasi (Kutch) 28*40'00"N 70*44'00"E
Khanpuri (Bahawalpur) 28*45'10"N 71*17'15"E
Kippianwala (Bahawalpur) 28*43'10"N 71*04'20"E
Kotada (Jamnagar) 22*12'00"N 70*22'00"E
Kudwala Ther (Bahawalpur) 29*11'30"N 71*53'00"E
Lakhmirwala (Bhatinda) 29*52'00"N 75*22'00"E
Lakhueenjo-daro (Sukkur) 27*43'00"N 68*50'00"E
Lathwala (Bahawalpur) 28*50'20"N 71*11'58"E
Lathwala Two (Bahawalpur) 28*50'00"N 71*11'57"E
Lundewali Two (Bahawalpur) 28*52'40"N 71*24'15"E
Lunida One (Bahawalpur) 28*53'15"N 71*06'43"E
Luppewala (Bahawalpur) 28*49'07"N 71*12'20"E

Lurewala (Bahawalpur) 29*05'34"N 71*34'56"E
Malhalewala (Bahawalpur) 29*10'40"N 72*09'48"E
Mangli Nichi (Ludhiana) 30*52'00"N 79*57'00"E
Mehrgarh (kachi) 29*25'00"N 67*3'00"E
Mundigak (Kandahar) 31*55'00"N 65*30'00"E
Mirana (Bahawalpur) 28*57'35"N 71*18'05"E
Mohenjo-daro (Larkana) 27*18'00"N 68*07'00E
Musafarwali Two (Bahawalpur) 28*46'22"N 71*09'02"E
Nagoor (Sukkur)
Nahriwala (Bhatinda) 30*05'00"N 75*25'00"E
Naiwala Theh (Bhatinda) 29*50'00"N 75*30"00"E
Naru Waro Dharo (Khairpur) 27*25'00N 68*41'00"E
Nindowari (Jhalawan) 26*57'00"N 66*04'00"E
Parharewala B (Bahawalpur) 28*04'56"N 71*11'13"E
Pasegam (Bhavnagar) 21*51'14"N 71*38'48"E
Periano Ghundai (Zhob) 31*22'00"N 69*23'00"E
Pir Hassan Shah (Kharan) 28*33'00"N 65*28'00"E
Q-32 (Quetta-Pishin) 30*18'00"N 66*57'00"E
Quetta Miri (Quetta-Pishin) 30*15'00"N 66*59'00"E
Rakhigari (Hissar) 29*17'30"N 76*06'50"E
Ram Theh (Hissar) 29*43'15"N 75*42'15"E
Rehman Dheri (Dera Ismail Khan) 31*57'00"N 70*46'00"E
Ropar (Ropar) 30*48'00"N 76*32'00"E
Sanukewala (Bahawalpur) 28*51'41"N 71*10'34"E
Shahiwala (Bahawalpur) 29*02'35"N 71*21'41"E
Sheruwala Ther (Bahawalpur) 28*43'52"N 71*13'20"E
Sheruwala Two (Bahawalpur) 28*43'55"N 71*14'25"E
Siah Damb Jhau (Jhalawan) 26*21'00"N 65*40'00"E
Sihnewali (Bhatinda) 29*55'00"N 75*30'00"E
Siswal (Hissar) 29*13'12"N 75*30'30"E
Sohniwali (Bahawalpur) 28*45'04"N 71*00'58"E
Taraghada (Rajkot) 21*44'00"N 70*26'00"E
Tharo Waro Daro (Sukkur)
Theriwala (Bahawalpur) 29*05'48"N 72*48'24"E
Vaharvo (Bhavnagar) 21*50'50"N 71*43'55"E
Venantha Timbo (Mehsana) 23*39'00"N 71*54'10"E
Tarana Three (Jamnagar) 22*43'00"N 70*27'00"E

Principal sites organized by State and District in Bharat

RAJASTHAN: GANESHWAR PERIOD
DISTRICT: SIKARBaleshwar 27.44N - 75.51E
Balwar 27.35N - 75.38E
Baneti 27.48N - 76.07E
Banher 27.50N - 76.07E
Barnagar 27.33N - 76.07E
Basri 27.38N - 75.45E
Beed-Ki-Jodhi 27.36N - 76.09E
Bhabra 27.28N - 76.01E
Bhadwari 27.34N - 75.40E
Bhaikhri 27.34N - 76.07E
Bhainsalana 27.39N - 76.05E
Bhakhtawar-Ki-Dhani 27.51N - 76.06E
Bihar 27.52N - 75.57E
Biharipura 27.54N - 75.54E
Bhojpura 27.33N - 75.35E
Bhukha Bhar 27.37N - 76.10E
Buchara 27.33N - 75.58E
Burha 27.54N - 75.58E
Butholi 27.41N - 75.46E
Chardera 27.51N - 76.06E
Chaudhri-Ka-Nangal 27.53N - 76.07E
Chiplata 27.34N - 75.34E
Dariba 27.41N - 75.54E
Dilpura 27.50N - 76.04E
Ganeshar 27.40N - 75.49E
Ghata 27.35N - 75.51E
Hothoka (Mothoka) 27.49N - 75.05E
Hovra 27.55N - 75.59E
Jodhpura 27.55N - 75.59E
Khera 27.55N - 75.59E
Kolyara 27.44N - 75.00E
Malawali Dhani 27.43N - 75.46E
Mando 27.44N - 75.00E
Nimki 27.35N - 75.36E
Pandtpur 27.36N - 76.03E
Paragpura 27.36N - 76.03E
Partheri 27.33N - 75.45E
Purani Partheri 27.37N - 76.09E
Rajnotha 27.36N - 76.10E
Ranasar 27.44N - 75.43E
Ram Jhalara 27.35N - 76.09E
Sarohi 27.43N - 75.44E
Sedoda 27.39N - 75.49E
Somanya-Ki-Baoli 27.32N - 75.56E
Thikria 27.32N - 76.06E
Thoi 27.32N - 76.45E
UTTAR PRADESH (HARAPPAN PERIOD)
DISTRICT: SAHARANPUR
Asan Wali 30.02N - 77.36E
Badgam 30.00N - 77.32E
Baundki 30.04N - 77.37E
Bazidpur 30.03N - 77.36E
Chhajpura 29.59N - 77.37E
Chhapar Heri 29.54N - 77.30E
Chilhera 30.02N - 77.39E
Chuehti Shekh 29.54N - 77.43E
Daudpur 30.05N - 77.36E
Fahtepur (Gujar) 29.53N - 77.32E
Fahtepur Jat 29.53N - 77.32E
Ghana Khandi 30.04N - 77.36E
Hulas Khera 29.42N - 77.22E
Kabirpur 30.05N - 77.38E
Kailaspur 29.59N - 77.39E
Krishni 29.55N - 77.30E
Mohiuddinpur 30.00N - 77.38E
Mohiuddinpur 30.00N - 77.28E

Matki Jharauli 30.04N - 77.35E
Nawan Gaon 29.53N - 77.26E
Piki 30.02N - 77.36E
Pilakhni 30.01N - 77.29E
Pinjaura 29.56N - 77.33E
Rangel 29.56N - 77.40E
Reri Malakpur 29.55N - 77.29E
Salepur 29.56N - 77.21E
Sarkari Sheikh 30.00N - 77.36E
Sherpur (Gujar) 29.53N - 77.39E
Tikrol 29.44N - 77.22E
DISTRICT: MEERUT
Alamgirpur 29.00N - 77.30E
Gulistanpur 28.30N - 77.30E
HARYANA (HARAPPAN PERIOD
DISTRICT: AMBALA
Dukheri 30.16N - 76.53E
DISTRICT: KURUKSHETRA
Ratta Kher Khuram 30.07N - 76.27E
DISTRICT: KARNAL
Bahola 29.48N - 76.46E
Bindrala 29.29N - 76.35E
Dikadla 29.13N - 77.04E
Jalmana 29.35N - 76.44E
Maudi 29.47N - 76.46E
Pujam 29.51N - 76.55E
Urlana Khurd 29.22N - 76.43E
DISTRICT: JIND
Balu 29.40N - 76.22E
Bata (Rani Ran) 29.43N - 76.19E
Dhakal 29.35N - 76.10E
Ghatouli 29.11N - 76.23E
Jind (Bir Band Ban) 29.19N - 76.19E
Kalait 29.40N - 76.16E
Kharal-3 29.42N - 76.03E
Pauli 29.05N - 76.28E
Ritauli 29.25N - 76.30E
DISTRICT: SONIPAT
Chhapra 29.07N - 76.32E
Garhwal 29.11N - 76.32E
DISTRICT: ROHTAK
Baliana 28.53N - 76.43E
Lohat 28.32N - 76.50E
DISTRICT: BHIWANI
Mitathal 28.52N - 76.11E
DISTRICT: HISSAR
Banawali 29.36N - 75.25E
Barki 29.17N - 75.46E
Bhirrana 29.32N - 75.32E
Chanat-1,2,3 29.14N - 75.55E
Chimun 29.40N - 75.40E
Garhi 29.04N - 76.07E
Gular Wala 29.43N - 75.46E
Hansi 29.04N - 76.59E
Kharar 29.08N - 75.54E
Kirtan 29.08N - 75.33E
Kunal 29.38N - 75.43E
Masaudpur 29.14N - 76.00E
Mirchpur 29.18N - 76.11E
Nathwan 29.07N - 75.35E
Pali-I 29.08N - 76.05E
Rajpura 29.11N - 76.07E
Rakhi Garhi 29.17N - 76.07E
Ratta Theh 29.44N - 75.45E
Satrod Khurd 29.06N - 75.47E
Sisai - III 29.10N - 76.00E
Siswal 29.13N - 75.30E
PUNJAB (HARAPPAN PERIOD
DISTRICT: AMRITSAR
Vadalan 31.49N - 76.48E
DISTRICT: KAPURTHALA
Bhatrpura Kalan 31.01N - 75.31E
Domeli 31.20N - 75.46E
DISTRICT: JULLUNDAR
Dhogri 31.23N - 75.40E

DISTRICT: RUPAR
Kotla Nihang 30.56N - 76.32E
Kotli 30.53N - 76.29E
Rupar 30.58N - 76.31E
DISTRICT: PATIALA
Dharm Heri 30.07N - 76.19E
Gheora -12 30.07N - 76.16E
Nagwan 30.07N - 76.23E
Sasi 30.07N - 76.20E
DISTRICT: SANGRUR
Budan 30.31N - 75.46E
Jandali 30.38N - 75.51E
Rohira 30.38N - 75.50E
Kalian 30.35N - 75.43E
Moholi 30.38N - 75.45E
DISTRICT: LUDHIANA
Kanganwal 30.51N - 75.56E
Malaud 30.38N - 75.57E
Sanghol 30.47N - 76.24E
Talwara 30.55N - 75.44E
DISTRICT: FARIDKOT
Inewala Theh 30.33N - 75.25E
Raja Sirkap 30.39N - 74.46E
DISTRICT: FEROZPUR
Amiwala Theh 30.20N - 75.15E
DISTRICT: BHATINDA
Ali-Da-Theh 30.20N - 75.20E
Alipur Mandran 29.50N - 75.28E
Bagliean-Da-Theh 29.56N - 75.29E
Chhoti Mansa 29.59N - 75.26E
Dale Wala-1,2 29.50N - 75.25E
Dalewan 30.02N - 75.33E
Gumi Kalan 29.59N - 75.33E
Hassanpur 29.59N - 75.33E
Hirke -I 29.44N - 75.22E
Karanpura 29.52N - 75.23E
Lakhmir Wala 29.52N - 75.22E
Lallian Wali 29.52N - 75.20E
Lalu Wala 29.59N - 75.27E
Naiwala Theh 29.50N - 75.30E
RAJASTHAN (HARAPPAN PERIOD)
DISTRICT: HANUMANGARH
Baror 29.10N - 73.20E
Bhagwansar 1 29.22N - 73.53E
Bhagwansar 2 29.23N - 73.53E
Binjor -I 29.14N - 73.07E
Binjor 3 29.00N - 77.12E
Bugian 29.22N - 73.38E
Chak-11 29.19N - 73.36E
Chak-15/3 29.19N - 73.36E
Chak-21 29.16N - 73.33E
Chak 43 29.10N - 73.29E
Chak 50 29.10N - 73.29E
Chak 71 29.14N - 73.17E
Chak 72/3 29.11N - 73.19E
Chak 75 29.11N - 73.18E
Chak 80 29.12N - 73.15E
Jogiason Chak -1 29.10N - 74.45E
Kalibangan 29.29N - 74.08E
Karoti 29.10N - 74.52E
Mallawala-Tioba
Mathula 29.14N - 74.34E
Motasar Tibba -1 29.09N - 73.23E
Motasar Tibba -2 29.09N - 73.27E
Nohar 29.10N - 74.45E
R.D -92/89 29.10N - 73.04E
Sardar Garh -2 29.23N - 73.45E
Sher Pura 29.10N - 75.15E
Sothi 29.11N - 74.50E
Tarkhana Wala Dera 29.14N - 73.14E
GUJARAT (HARAPPAN PERIOD)
DISTRICT: KUTCH
Chitrol 23.24N - 70.40E
Desalpur 23.29N - 69.10E
Dholvira (Kotadi) 23.58N - 70.12E

Gadhwaliwadi 23.30N - 69.03E
Gunthai 23.28N - 69.09E
Jatavadar 23.45N - 70.40E
Kanthkot 23.29N - 70.29E
Kerasi 23.40N - 70.44E
Khakhra Dera 23.34N - 70.29E
Khari-Ka-Khanda 23.27N - 70.19E
Khedoi 23.03N - 69.57E
Kotada Bhadli 1 23.22N - 69.26E
Kotada Bhadli 2 23.22N - 69.26E
Kotada 23.17N - 70.06E
Kotadi 23.58N - 70.12E
Kotara-Juni-Karan 24.00N - 69.45E
Lakhapar 23.33N - 70.28E
Lakhpat 23.50N - 68.47E
Morvo 23.50N - 70.42E
Narapa 23.34N - 69.05E
Nenu-Ni-Dhar 23.51N - 69.44E
Pirwada 23.20N - 70.00E
Pabunath 23.38N - 70.31E
Rampara (Vekera No Timbo) 23.30N - 70.45E
Ramvav 23.32N - 70.28E
Samaghoga 22.55N - 69.40E
Selari 22.42N - 70.37E
Surkotada 23.37N - 70.50E
Todio 23.05N - 69.55E
Vada 23.34N - 69.03E
DISTRICT: BANASKANTHA
Atarnes 23.40N - 71.20E
Benap 24.05N - 71.25E
Jhekada 23.50N - 71.25E
DISTRICT: MEHSANA
Dudka 23.32N - 71.46E
Kuwar 23.32N - 71.37E
Lalara 23.33N - 71.47E
Mahudi 23.30N - 72.45E
Pirozpur 23.30N - 71.43E
Bolera 23.30N - 71.45E
Khandia 23.32N - 71.45E
Manverpur 23.35N - 71.54E
Dhanora 23.31N - 71.55E
Dantisana 23.30N - 71.54E
Sushiya 23.28N - 71.53E
Ervada 23.25N - 71.53E
Panchasar 23.25N - 71.49E
Panva 23.23N - 71.49E
Sibpur 23.33N - 71.46E
Sujnipur 23.53N - 72.05E
DISTRICT: JAMNAGAR
Ambaliala 22.56N - 69.44E
Bedwarka 22.28N - 70.26E
Bhayakhakharia 22.10N - 71.50E
Chanderwara 21.51N - 69.24E
Kotda 23.14N - 70.21E
Lakhan Timbo 22.29N - 70.26E
Mulpadar 21.56N - 69.44E
Saudevalio 22.00N - 69.44E
Tarana 22.43N - 70.27E
DISTRICT: JUNAGAH
Savani 20.58N - 70.28E
DISTRICT: RAJKOT
Bhut Kotada 22.35N - 70.45E
Dad 22.50N - 70.55E
Dhutapur 21.50N - 71.00E
Dumaini 21.45N - 70.20E
Dungarpur 22.71N - 71.31E
Gadhada -1 22.26N - 70.36E
Gadhada -2 22.26N - 70.36E
Gadhada -3 22.26N - 70.36E
Jhikri 21.55N - 70.50E
Jodhpur 22.40N - 70.53E
Karmar 21.50N - 70.53E
Khankhara Bela -1 22.29N - 70.36E
Khankhara Bela -2 22.29N - 70.36E

Khareda-No-Timbo 22.05N - 70.48E
Lukhela 21.50N - 70.00E
Malgodh 22.00N - 70.34E
Padar 21.59N - 70.50E
Pal 22.18N - 70.43E
Pithad 21.57N - 70.44E
Pithadia 21.48N - 70.49E
Rajathali 21.55N - 70.01E
Taraghada 21.50N - 71.28E
Timaram 21.53N - 70.30E
Vadasada 21.47N - 70.30E
Vegadi 21.47N - 70.30E
DISTRICT: AMRELI
Bhatiwadi 21.45N - 70.50E
Dhankanio -2 21.47N - 70.55E
Dhuapino 21.27N - 71.49E
Vadera 21.36N - 71.06E
DISTRICT: BHAVNAGAR
Gheolo Bund 21.58N - 71.27E
Khodiyar 21.24N - 71.09E
Lakhavav 21.30N - 71.55E
Valpura 21.57N - 71.42E
DISTRICT: SURENDRA NAGAR
Chashiana 22.25N - 71.50E
Goni Timbo 22.27N - 71.55E
Kaero Timbo 22.24N - 71.55E
Khanpur 22.32N - 71.58E
Rangpur 22.20N - 71.55E
Samadhiala 22.19N - 71.42E
DISTRICT: AHMEDABAD*
Bhimnath 22.15N - 71.55E
Chhabasr 22.46N - 72.16E
Devganga 22.18N - 71.50E
Hadmatala 22.30N - 72.03E
Kanasutaria 22.47N - 72.16E
Lothal 22.31N - 72.15E
Metal Maha No Timbo 22.47N - 72.14E
Talwandi No Timbo 22.45N - 72.20E
DISTRICT: KHERA
Kerisima No Timbo 22.28N - 72.31E
Sai No Tikro 22.28N - 72.31E
DISTRICT: BHARUCH
Manar 21.42N - 72.47E
DISTRICT: SURAT
Navagam 21.16N - 72.56E

CHOLISTAN DESERT, PAKISTAN

Bhawalpur area : archaeological sites in the Cholistan or Rohi desert, along 300 miles of the dry bed of the Hakra River (10-15 mile-wide-strip), the stretch of the Sarasvati river in Bahawalpur province adjoining the Rajasthan State (Marusthali or Thar desert)

(414 sites including Ganweriwala Ther, Gamuwali, Dunkkian, Wariyal, Sandhanawala) [cf. Rafique Mughal, *Ancient Cholistan*, 1997]

Principal Sites:

Arabian Sea
Bet Dwaraka island
Gulf of Khambat (Cambay)
Prabhas Patan (Somnath)
Rojdi 21.50N 70.45E
Lothal 22.31N 72.15E
Marusthali
Jodhpura 27.31N 76.05E
Ganeshwar 37.40N 75.51E
Rann of Kutch
Kotada Timba, Kotadi
(Dholavira) 23.58N 70.12E
Surkotada 23.37N 70.50E
Pabumath 23.38N 70.31E
Desalpur 23.29N 69.10E
Sarasvati River
Gamanwala
Ganweriwala Ther 28.50N 71.10E
(Cholistan or Rohi Desert)
Khirsara, Khera-sara (Netra)
Tarkhanawala-dera 29.14N 73.14E
Sandhanawala-thera
(Near Fort Abbas)
Mohenjodaro
(Island between W. Nara Loop-- Sarasvati river and Sindhu river)
Kalibangan 29.29N 74.08E
Banawali 29.37N 75.23E
Rakhigarhi 29.17N 76.07E
Alamgirpur 29.00N 77.30E
Hulas 29.42N 77.22E
Rohira 30.38N 75.50E
Chandigarh 30.45N 76.47E
Rupar 30.58N 76.31E
Godavari river
Daimabad 19.31N 74.42E
Sindhu river
Gharo Bhiro (Nuhato)
Allahdino
Bala Kot
Amri
Chanhujo-daro
Nindowari-damb
Lohumjo-daro
KotDiji
Naru-waro-daro
Jhukar*

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AV. Atharvaveda
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ChUp. Cha_ndogya-Upanis.ad
CII Corpus Inscriptionum Indicarum
CITD Corpus of Inscriptions in the Telingana Districts of HEH the Nizam's Dominions, P. Sreenivasachar

DBIA M.B. Emeneau and T. Burrow, Dravidian Borrowings from Indo-Aryan, UPCL, vol.26, Berkeley, 1962
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Gr.S. Gr.hya-Su_tra
Gr.S'r. Gr.hya- and S'rauta-Su_tra
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Iraku. Irakuvamicam (Aracake_cari)
Ira_mana_. Ira_mana_t.akam (Arun.a_cala-k-kavira_yar)
Ira_ma. Pan.avit.u. Pan.avit.utu_tu
Irucamaya. Irucamaya Vil.akkam (Arita_car)
Ilak. Aka. Ilakkiya-c-colakara_ti (Kuma_racuva_mi Pil.l.ai)
Ilak. Kot. Ilakkan.akkottu (Cuva_mina_ta Te_cikar)
Ilak. Vi. Ilakkan.a Vil.akkam (Vaittiyana_ta Te_cikar)
Ir-ai. Ir-aiyan-a_rakapporul. (Kan.akka_yan-a_r Makan-a_r Nakki_ran-a_r)
In-. Na_r-. In-n-a_r-patu (Kapilar)
In-i. Na_r-. In-iyavai Na_r-patu (Pu_tace_ntan-a_r)
I_t.t.iyer..u. I_t.t.iyer..upatu (Ot.t.akku_ttar)
I_t.u (Nampil.l.ai) I_t.u, A_r-a_.Tiruva_ymor..i: Vya_kya_nam: A_r-a_yirappat.i (Ce_. Kirus.n.ama_ Ca_riya_r)
Upate_caka_ Upate_caka_n.t.am
Uri. Ni. Uriccol nikan.t.u

Ain:kur-u. Ain:kur-unu_r-u (San:gam age scholars)
Or..ivi. Or..ivilot.ukkam
Kat.t.at.a Na_ma_ Kat.t.at.a ve_laiyin- Na_ma_val.i
Kanta. Pu. Kantapura_n.am (Kacciyappa Civa_ca_riyar)
Kantaran. Kantarnta_ti (Arun.akirina_tar)
Kantarala. Kantaralan:ka_ram (Arun.akirina_tar)
Kantaran-u. Kantaran-upu_ti (Arun.akirina_tar)
Kamparan. Kamparanta_ti (Civaja_n-a Cuva_mikal.)
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Karu. Aka. Karupporul.akara_ti
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Kalin.. Kalin:kattupparan.i (Cayan:kon.t.a_n-)
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Ka_cika. Ka_cikan.t.am
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Kuruparam. Kuruparampara_prapa_vam
Kur-r-a_. Kur-a. Tirukkur-r-a_la-k-kur-avaci
Kur-r-a_. Tala. Tirukkur-r-a_la-t-talapura_n.am
Kur-al. Tirukkur-al. (Tiruval.l.uvar)
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Catu. Caturakara_ti (Vi_rama_mun-ivar), 1860
Ci. Ci. Civaja_n-a Cittiya_r Cupaks.am (Arun.anti Civa_ca_riyar)

Ci. Po_. Civaja_n-a Po_tam (Meykan.t.a Te_var)
Ci. Po_. Cir-. Civaja_n-a Po_ta-c-cir-r-urai Vil.akkam (Ko. Muttaiyapil.l.ai)
Cinta_. Ni. Cinta_man.i Nikan.t.u
Cilap. Cilappatika_ram (Il.an:ko_vat.ikal..)
Cilap. Arum. Cilappatika_ram Arumpatavurai
Cilap. Urai. Cilappatika_ram, At.iya_rkku Nalla_rurai
Civacama. Civacamava_ta vurai Mar-uppu (Civaja_n-cuva_mikal..)
Civataru. Civatarumo_ttaram (Mar-aija_n-campantar)
Civappira. Civappiraka_cam (Umapati Civa_ca_riyar)
Civaraka. Civarakaciyam (Oppila_man.ite_cikar)
Cir-upa. Cir-upacamu_lam (Ka_riya_ca_n-)
Cir-upa_n. Pattuppa_t.t.u: Cir-upa_n.a_r-r-uppat.ai (It.aikkar..i Na_t.t.u Nallu_r Nattattan-a_r)
Ci_vaka. Ci_vakacinta_man.i (Tiruttakka Te_var)
Cukkira. Cukkirani_ti (Katire_ca Cet.t.iya_r)
Cu_t.a_ Cu_t.a_man.i Nikan.t.u (Man.t.alapurut.an-)
Cevvanti. Pu. Cevvanti-p-pura_n.am (Ellappa Na_valar)
Ce_kkir..a_r. Pu. Ce_kkir..a_r Na_yan-a_r Pura_nam (Uma_pati Civa_ca_riyar)
Ce_tupu. Ce_tupura_n.am (Nirampavar..akiya Te_cikar)
Caivaca. Caivacamaya Ner-i (Mar-aija_n-a Campantana_yan-a_r)
Caivap. Caivappiraka_can-am (Can:karapan.t.itar)
Caivavi. Caiva vin-a_ vit.ai (A_r-umukana_valar)
Ja_n-ava_. Ja_n-ava_cit.t.am (Vacit.t.ar)
Ja_n-a_. Ja_n-a_mirtam (Va_ci_ka Mun-ivar)
Ta.Ni.Po_. Tattuva Nica_n-u Po_kaca_ram (Tattuvalin:ka Te_var)
Takkaya_kap. Takkaya_kapparan.i (Ot.t.akku_ttar)
Tacaka_. Tacaka_riyam (Citamparana_ta Te_cikar)
Tacaiva_. Tacaiva_n.an- Ko_vai (Poyya_mor..ippulavar)
Tan.t.alai. Tan.t.alaiya_r Catakam (Pat.ikka_cu-p-pulavar)
Tan.t.i. Tan.t.iyalan:ka_ram (Tan.t.iya_ciriyar)
Tan.ikai. Tan.ikaippura_n (Kacciyappa Mun-ivar)
Tattuvap. Tattuvappiraka_cam
Tamir..na_. Tamir..na_valar Caritai
Tan-ippa_. Tan-ippa_t.ar-r-irat.t.u (Cantirace_kara Kavira_ja Pan.t.itar)

Ta_yu. Ta_yuma_n-a Cuva_mikal. Pa_t.al
Tirikat.u. Tirikat.ukam (Nalla_tan-a_r)
Tirukka_l.at. Pu. Tirukka_l.atti-p-pura_n.am (A_n-antakku_ttar)
Tirukko_. Tirukko_vaiya_r (Ma_n.ikkava_caka Cuva_mikal..)
Tirunu_r-. Tirunu_r-r-anta_ti (Aviro_tiya_r..va_r)
Tiruppu. Tiruppukar.. (Arun.akirina_tar)
Tiruman. Tirumantiram (Tirumu_lana_yan-a_r)
Tirumuru. Pattuppa_t.t.u: Tirumuruka_r-r-uppat.ai (Nakki_rar)
Tiruva_ca. Tiruva_cakam (Ma_n.ikkava_caka Cuva_mikal.)
Tiruva_lava_. Tiruva_lavut.aiya_r Tiruvil.aiya_t.ar- Pura_n.am (Perumpar-r-appuliyu_r Nampi)
Tiruvicai. Tiruvicaippa_
Tiruvirut. Tiruviruttam (Namma_r..va_r)
Tiruvil.ai. Tiruvil.aiya_t.ar- Pura_n.am (Paraco_ti Mun-ivar)
Tiruve_n.. Cata. Tiruve_n:kat.a Catakam (Na_ra_yan.a Pa_ratiya_r)
Tiv. Na_la_yira Tivyappirapantam (A_r..va_rkal.)
Tiv. Tiruvirut. Tiruviruttam (Namma_r..va_r)
Tiv. Tiruva_ci. Tiruva_ciriyam (Namma_r..va_r)
Tiv. Periya tiruvan. Periya Tiruvanta_ti (Namma_r..va_r)
Tiv. Tiruppa_. Tiruppa_vai (A_n.t.a_l.)
Tiv. Tiruva_y. Tiruva_ymor..i (Namma_r..va_r)
Tiv. Na_yc. Na_ycciya_r Tirumor..i (A_n.t.a_l.)
Tiv. Periyati. Periya Tirumor..i (Tiruman:kai-y-a_r..va_r)
Tiv. Periya_r.. Periya_r..va_r Tirumor..i (Periya_r..va_r)
Tiva_. Ce_ntan- Tiva_karam (Ce_ntan-a_r)
Te_va_. Te_va_ram (1,2,3: Tiruja_na Campanta Mu_rttikal.; 4,5,6: Tiruna_vukkaracu Cuva_mikal.; 7: Cuntaramu_rtti Cuva_mikal..)
Tailava. Tailavarukka-c-curukkam (Te_raiyar)
Tol. Er..ut. Tolka_ppiya Er..uttatika_ram (Il.ampu_ran.arurai; Naccin-a_rkkin-iyarurai)
Tol. Col. Tolka_ppiya-c-collatika_ram (as above; Ce_n-a_varaiyarurai; Teyva-c-cilaiya_rurai)
Tol. Pa_yi. Tolka_ppiya-p-pa_yira virutti (Civaja_n-a Mun-ivar)
Tol. Po. Tolka_ppiya-p-porul.atika_ram

Ton-. Vi. Ton-n-u_l Vil.akkam (Vi_rama_ Mun-ivar)
Nampiyakap. Akapporul. Vil.akkam (Na_r-kavira_ca Nampi)
Nalvar..i Nalvar..i (Auvaiya_r)
Nal.a Nal.aven.pa_ (Pukar..e_ntippulavar)
Nar-. Nar-r-in.ai (San:gam age scholars)
Nan-. Urai. Nan-n-u_l viruttiyurai (Pavan.anti Mun-ivar)
Nan-. Mayilai. Nan-n-u_l Mayilai Na_tarurai (Mayilai Na_tar)
Nan-n-er-i Nan-n-er-i (Civappiraka_ca Cuva_mikal..)
Na_ma. Nika. Na_mati_pa Nikan.t.u (Civacuppiraman.iya-k-kavira_yar)
Na_lat.i. Na_lat.iya_r (Caman.amun-ivarkal..)
Na_n-man.i. Na_n-man.i-k-kat.ikai (Vil.ampina_kan-a_r)
Net.unal. Pattuppa_t.t.u: Net.unalva_t.ai (Nakki_rar)
Nait.ata Nait.atam (Ativi_rara_mapa_n.t.iyar)
Pac. Mu_. Paccilai Mu_likai Akara_ti
Paca_k. Paca_kkarama_lai (Kan.n.ut.aiya Val.l.ala_r)
Pat.t.in-at. Tiruppa_. Pat.t.in-atta_r Tiruppa_t.ar-r-irat.t.u
Pat.t.in-ap. Pattuppa_t.t.u: Pat.t.in-appa_lai (Uruttiran:kan.n.an-a_r)
Pan.avit.u. Pan.avit.utu_tu
Pata_rtta. Pata_rttakun.a Cinta_man.i (Patin-en.cittar)
Patir-r-up. Patir-r-uppattu
Patin-o. Patin-ora_ntirumur-ai
Parata. Parataca_stiram (Arapattana_valar)
Paripa_. Paripa_t.al (Can:kappulavarkal.: San:gam age scholars)
Par..a. Par..amor..i (Mun-r-ur-aiyaraiyar)
Par..ama. Par..amalaiyanta_ti (Civappiraka_ca Cuva_mikal..)
Par-a_l.ai. Pal.l.u Par-a_l.aivina_yakarpal.l.u (Jampulin:kam Pil.l.ai)
Pan-n-irupa_. Pan-n-irupa_t.t.iyal (Poykaiya_r etc. San:gam affiliates)
Pa_kava. Pa_kavatam (Cevvai-c-cu_t.uva_r)
Pa_rata. Maka_pa_ratam (Villiputtu_ra_r..va_r)
Pa_rataven.. Pa_rataven.pa_ (Perunte_van-a_r)
Pa_lakan.i. Pa_lakan.itam (Na_ra_yan.aswa_mi aiyar)
Pa_lava_. Palava_kat.attirat.t.u (Patin-en.cittar)
Pin.. Pin:kalanikan.t.u (Pin:kalamun-ivar)
Pira_ta_pa. Pirata_pa Mutalia_r Carittiram (Ve_tana_yakam Pil.l.ai)

Pirapa. Pirapacaur-patti (Mun-ica_mi Mutalia_r)
Pirapulin.. Pirapulin:kali_lai (Civappiraka_ca Cuva_mikal.)
Pirapo_ta. Pirapo_tacantiro_tayam (Ma_tai-t-tiruve_nkat.ana_tar)
Piramo_t. Piramo_ttaraka_n.t.am (Varatun:kara_mapa_n.t.iyan-)
Pu. Ve. Pur-apporul. Ven.pa_ma_lai (Aiyan-a_ritan-a_r)
Puliyu_ran. Puliyu_ranta_ti (Mayilva_kan-appulavar)
Pur-ana_. Pur-ana_n-u_r-u (San:gam age scholars)
Periyapu. Periyapura_n.am (Ce_kkir..a_r)
Perun.. Perun:katai (Kon:kuve_l.ir)
Perunto. Peruntokai (Ira_kavaiyan:ka_r, Mu.)
Perumpa_n. Pattuppa_t.t.u: Perumpa_n.a_r-r-uppat.ai (Uruttiran. Kan.n.a_r)
Pe_rakat. Pe_rakattiyam (Akastiyar)
Pais.aja. Pais.ajakalpam (Jakana_tam na_yut.u, Ma.)
Piti. Ni. Potikai Nikan.t.u (Cuva_mina_ta Kavira_yar)
Porut.. Ni. Porut.t.okai Nikan.t.u (Cuppiraman.iyapa_rati.)
Poruna. Pattuppa_t.t.u: Porunara_r-r-uppat.ai (Mut.atta_ma-k-kan.n.iya_r)
Maccapu. Maccapura_n.am (Vat.amalaiyappa Pil.l.aiyan-)
Man.i. Man.ime_kalai (Ca_ttan-a_r)
Maturakavi. Maturakavipatam (Maturakavipa_rati)
Maturaik. Pattuppa_t.t.u: Maturaikka_ci (Maran:kut.i Marutan-a_r)
Maturaic. Ula_. Maturai-c-cokkana_tarula_ (Pura_n.a-t-tirumalaina_tar)
Maturaittala. Maturaittala Varala_r-u
Maturaip. Maturaippatir-r-uppattanta_ti
Marutu_. Marutu_ranta_ti (Talaimalaikan.t.a Te_var)
Malai. Vaittiya Malaiyakara_ti (Talaimalaikan.t.a Te_var)
Malaipat.u. Pattuppa_t.t.u: Malaipat.ukat.a_m (Perun:kaucikan-a_r)
Mar-aicai. Mar-aicaiyanta_ti (Cin-n-attampi-p-pulavar)
Ma_t.t.uva_. Ma_t.t.uva_kat.am (Akastiyar)
Ma_lumi. Ma_lumica_stira-c-curukkam (Mor-r-imar Kulace_karam)
Ma_r-an-a. Ma_r-an-alan:ka_ram (Tirukkurukaipperuma_t.kavira_yar)
Mi_n-a_. Carit. Mi_na_ks.i Cuntaram Pil.l.aiyavarkal. Carittiram (Ca_mina_taiyar, U. Ve.)
Muttol.. Muttol.l.a_yiram
Mutu. Ka_. Mutumor..ikka_ci (Maturai-k-ku_t.alu_r kir..a_r)

Mullaip. Pattuppa_t.t.u: Mullaippa_t.t.u (Nappu_tan-a_r)
Mullaiyan. Tirumullaiva_yilanta_ti (Civaja_n- Mun-ivar)
Mu_. A. Vaittiya Mu_likai Virivakara_ti (Patin-en.cittar)
Mu_turai Mu_turai (Auvaiya_r)
Mu_varula_ Mu_varula_ (Ot.t.akku_ttar)
Me_ruman. Me_rumantarapura_n.am (Va_man-a Mun-ivar)
Yaco_tara. Yaco_taraka_viyam (Jain-a Mun-ivar)
Ya_p. Ya_pparun:kalam (Amitaca_karar)
Varun.akula_. Varun.akula_tittan-ula_mat.al (Ni_la_yata_ks.i)
Val.l.a. Val.l.ala_rca_ttiram (Kan.n.ut.aiya Val.l.al)
Vikkirama. Ula_. Vikkiramaco_r..an-ula_ (Ot.t.akku_ttar)
Vita_n-a. Vita_n-ama_lai (Na_ra_yan.a Cuva_mikal..)
Vina_yakapu. Vina_yaka Pura_n.am (Kacciyappa Mun-ivar)
Vi_raco_. Vi_raco_r..iyam (Puttamittiran-a_r)
Ven:kaikkala. Ven:kaikkalampakam (Civappiraka_ca Cuva_mikal.)
Ven:kaik. Ven:kaikko_vai (Civappiraka_ca Cuva_mikal.)
Ven.pa_p. Ven.pa_ppa_t.t.iyal (Kun.vi_rapan.t.itar)
Ve_ta_. Cu_. Ve_ta_nta Cu_l.a_man.i (Civappiraka_ca Cuva_mikal.)
Ve_ta_. Pari. Ve_ta_nta Paripa_s.ai (Ta_mara_jati_ks.ita Cuva_mikal.)
Vai. Mu. Vaittiya Mu_likai Akara_ti

3. Other References (Tamil lexicon)
At. Attiya_yam
Ati. Atika_ram
Arum. Arumpatavakara_ti
Avai. Avaiyat.akkam
Tan-i. Tan-iyan-
Tan-ippa_. Tan-ippa_t.al
Pra. Prave_cam
Pak. Pakkam
Pati. Patikam
Patip. Patippu
Pa_. Pa_t.al
Pa_yi. Pa_yiram

Pi-m. Piratipe_tam
Putu. Putuppatippu
Me_r-. Mer-ko_l.
Vya_. Vya_kya_n-am

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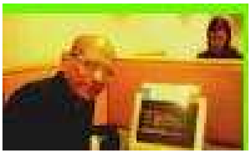
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bout the Author



Dr. S. Kalyanaraman using the Doe Library in University of California, Berkeley (June 22, 1998).

Dr. S. Kalyanaraman is a former Senior Executive of the Asian Development Bank, Manila, Philippines where he has worked for 18 years until 1995. In 1995 he chose to retire 5 years' ahead of time, to devote himself fully to the Sarasvati River Research.

Dr. S. Kalyanaraman (60), was born on 20 October 1939. His mother tongue is Tamil but all his school and undergraduate education was in Telugu and Sanskrit in Andhra Pradesh—Penukonda, Anantapur. He is conversant with Tamil, Telugu, Kannada, Hindi and Sanskrit languages.

At present, he is working on Sarasvati river research through his Sarasvati Sindhu Research Centre in Chennai. Since his return to India in 1995 and presentation of a paper in the Tenth World Sanskrit Conference on his research findings, he has devoted himself to promoting projects for the revival of the Sarasvati River

He has shown that the great Vedic Sarasvati River can be revived by tapping groundwater resources, in a sustainable way, and by linking with the perennial waters of the Sutlej, through an extension of the Rajasthan Canal, and making the Thar desert in Rajasthan bloom. Following his announcement in the World

Sanskrit Conference in 1996 on the findings related to Sarasvati River and Sarasvati Civilization, a scientific conference was held in Baroda in December 1998 and the proceedings are included in a work called *Vedic Sarasvati* published by the Geological Society of India, Bangalore.

Now he is involved in promoting the design of ongoing projects to revive the Legendary Sarasvati River. Projects have been started in Haryana, Punjab and Rajasthan to revive the old channels, to link with the Sutlej waters and to extend the Rajasthan Canal beyond Jodhpur upto Gujarat to rejuvenate the NW India Drainage System which is indeed the Revival of part of the Sarasvati River System which was desiccated between 1900 to 1500 BC due to tectonic causes. This is an unparalleled event in human civilization.

Dr. Kalayanaraman has interest in a variety of subjects.

Following his life-long interest in ancient Indian studies, he has compiled a unique, multilingual dictionary of the Dravidian, Aryan and Mundarica language families which took 18 years to complete. It runs to over 2,000 pages with nearly 5 lakh words from over 25 ancient Indian languages. The dictionary called *Indian Lexicon* is made available on the Internet (http://sarasvati.simplenet.com)

His work: *Indian Alchemy: Soma in the Veda* is in Press (Munshiram Manoharlal, Delhi). He has compiled an *Encyclopaedia on Sarasvati* in 5 volumes. He has contributed to Prof. Debiprasad Chattopadhyaya's multi-volume work on *History of Science and Technology in Ancient India.*

He is a graduate in Economics and Statistics from Annamalai University where he had Hindi as his second language. He has a

doctorate in Public Administration from the University of the Philippines; his thesis has been published (Delhi, Ashish Publishers) as a book: *Public Administration in Asia*,, a comparative study of development administration in six Asian countries (India, Bangladesh, Pakistan, Thailand, Indonesia, Philippines). He joined the Asian Development Bank in 1978; prior to this, he was a Member of the Indian Railway Accounts Service in 1962. He has worked as Dy. Financial Adviser on the Indian Railways and as Chief Controller of Accounts in the Karnataka Electricity Board.

In the '70s, his performance on coal accounting for and the drawing up the Indian Railways' perspective plan for information technology (IT) came in for praise and subsequently, he was deputed to the ADB. Dr. Kalyanaraman helped establish the Bank's IT network with 2,500 workstations. He is widely traveled and has visited a number of countries in the Asia-Pacific Region as he was responsible for managing the disbursements of a loan portfolio of US Dollars 60 billion to 600 development projects in countries such as China, Indonesia, Pakistan, Bangladesh, India, South Korea and 23 other countries.

For the Sarasvati River Work:, he has created a website with over 30,000 files and has been well received internationally. The URL is: http://sarasvati.simplenet.com

Diacritical marks used

The Kyoto-Harvard convention is NOT used since the intermingling of English words with Indian language words wll distort the representation of capital letters and is not easy to read.

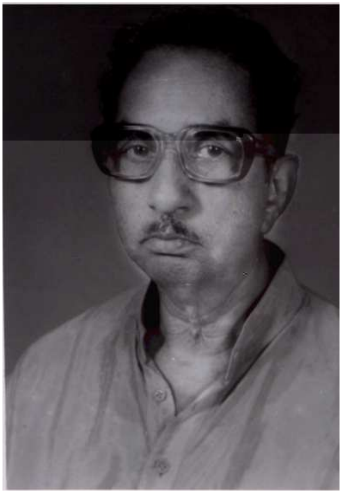
The standard diacritical marks are deployed but, instead of ligaturing them on top and bottom of the alphabet, the diacritical marks FOLLOW immediately after the vowel or consonant which is modified. For e.g., a_ connotes ‘long a’, n. connotes retroflex N. After the UNICODE is standardized, the next edition will display the modified codes for ease of representation on web pages on the internet.

Abbreviations used for linguistic categories and other languages

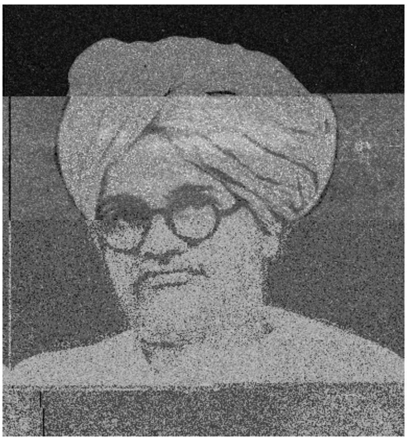
Foreword

It gives me great pleasure to present this foreword to a monumental, encyclopaedic work by Dr. S. Kalyanaraman.

This is truly a tribute to two great patriots of the nation, Babasaheb (Uma_ka_nt kes'av) Apte and Padmas'ri_ the late Shri V.S. Vakan.kar who have made significant contributions to the resurgence of interest in the country's historical and cultural studies. Babasaheb believed that a true understanding of the country's history and a celebration of the country's Sanskrit heritage are important components for realizing our true identity.



Vakan.kar the archaeologist inspired a team of scholars to undertake a journey in search of the River Sarasvati, adored in the R.gveda so ecstatically. This was the Sarasvati_ Nadi_ S'odh Abhiya_n started in 1985. In search of the nadi_ ru_pa_ Sarasvati_ we trekked a long distance and were welcomed by thousands of enthusiastic citizens who, even today, recall with a sense of joy and pride about the heritage bequeathed to us by our ancestors, r.s.is and muni-s. The r.s.is and muni-s are the thinkers and philosophers who have laid the foundation for the nation, which is referred to in the R.gveda as Bha_ratam Janam.



Dr. Kalyanaraman's scholarly work is epoch-making. It presents a well-documented, well-referenced, thoroughly-researched, multi-disciplinary perspective on the desiccation of the Vedic River Sarasvati_. More significantly, the possibility of the revival of this mighty river is a matter of pride for every citizen of Bha_rat, justified pride in the competence of our

scholars, scientists, engineers and policy-makers.

This is a fitting tribute to Baba Saheb (Umakanta Keshav) Apte who was a patriot.

The work of Dr. Kalyanaraman will speak for itself. I am sure that this will bring forth a paradigm-shift in studies related to ancient Bha_rat and provide an evidential- framework for a better understanding of our cultural and historical heritage. I hope the textbooks which our children read in history, social studies or geography reflect the findings related to glaciology and River Sarasvati which indicate the indigenous evolution of Bha_rati_ya culture for tens of thousands of years. I wish Dr. Kalyanaraman and Shri Hari Bhau Vaze who is the National Organizing Secretary of the Yojana every success in their mission which is of great importance to strengthening the human spirit which is the very foundation for the ra_s.t.ra ja_garan.

I hope that the revival of the River Sarasvati, together with the inter-linking of river basins will be taken up as priority projects of strategic importance to defend the culture and territorial integrity of Bha_rat and to add arable land to the granary of the country. It will be a dream come true for Babasaheb and Vakan.kar if the children of Bha_rat can go on a pilgrimage from Dwa_raka through Somnath to Mathura along the revived River Sarasvati_ and commemorate the sheet anchor of our history from the days of the start of the Kaliyuga, the Maha_bha_rata which relates the pilgrimage of Shri Balara_ma.

The R.gveda and other vedic sacred texts of the pun.yabhu_mi Bha_rat are the very foundations of Bha_rati_ya Samskr.ti and the speedy execution of the Sarasvati River projects will be a fitting tribute to these patriots and make Sarasvati_ meaningful for the children of the present and future generations as the personification of water from the Himalayan glaciers – devata_tma_ hima_layah --, which is the very sustenance for a basic need of our civilization.

M.N. Pingley
Kaliyugabda 5102. Shalivahana Shaka 1922. Magha Shukla Vasant Panchami

: Sarasvati Nadi Janma Divasa. 2001 CE January 29.

Publisher's Note

On behalf of Baba Saheb (Umakanta Keshav) Apte Smarak Samiti, it gives me great pleasure to publish this monumental work of Dr. S. Kalyanaraman with 670 illustrations, well-researched documentation and a comprehensive bibliography.

One of the principal objectives of the Baba Saheb (Umakanta Keshav) Apte Smarak Samiti is the objective study of the history of our nation. For this purpose the Akhila Bharatiya Itihaasa Sankalana Yojana has been working with a number of scholars and institutions organizing seminars and conferences and bringing out publications. The research project started by the late Vakankar has generated unprecedented enthusiasm and interested among the scholars and students alike in the country. A milestone in the ongoing project work is the publication of this veritable encyclopaedia on River Sarasvati. We look forward to publishing sequels to this work in four additional volumes.

The Samiti has programmes to start research cells in educational institutions all over the country and to provide scholarship and other assistance to students interested in pursuing research studies in the history of our country in all its aspects, so as to bring out a comprehensive, integrated perspective on our heritage and to provide well-documented foundations for our cultural identity and the efforts of our ancestors which have contributed to the building up of the nation.

The Samiti is a non-profit, voluntary organization and is entirely supported by volunteers and philanthropists. We look forward to continued cooperation and assistance in pursuing the laudable objectives of the Samiti and to enhance the standards of research studies in every part of the country. A major project of the Samiti is to compile the history of every district in every state of the country and to compile the history of the vanava_si bandhu. The Samiti will also collaborate with educational institutions and educationists to further improve the education system of the country and to promote the advancement

of Samskr.tam in our schools, colleges and universities and institutions of advanced learning.

Many well-wishers of the Babasaheb (Uma_ka_nta) Apte Sma_rak Samiti have contributed in a variety of ways to making the mission of this non-profit-making, voluntary organization meaningful and relevant to every Bha_rati_ya. A major activity of the Samiti is the research on the country's history and culture through the aegis of the Akhila Bha_rati_ya Itiha_sa San:kalana Yojana; an ace project of this Yojana is the research on River Sarasvati. The publication of Dr. Kalyanaraman's work, Sarasvati, is a milestone-event in the activities of the Yojana. I wish to thank all the well-wishers and contributors to the Samiti's work. In particular, I would like to acknowledge with gratitude the contribution made by Shri G.K. Pulla Reddy whose contribution has made the printing of this publication possible. This will be followed by many more works and research studies. There are plans for starting research cells in major educational institutions and to award scholarships to deserving scholars. We need the continued assistance and help from all our well-wishers.

The Samiti will endeavour to organize international conferences on various subjects related to the country's itiha_sa , on River Sarasvati_ which has been shown to be the very fountain of our Vedic heritage. We appeal to all scholars, scientists, educationists, students and youth of the country to suppor the cause by participating in the activities and projects undertaken by the Samiti.

Haribhau Vaze
National Organizing Secretary, Akhil Bharatiya Itihaasa Sankalana Yojana and Trustee,
Baba Saheb (Umakanta Keshav) Apte Smarak Samiti, Bangalore.

Kaliyugabda 5102. Shalivahana Shaka 1922. Magha Shukla Vasant Panchami : Sarasvati Nadi Janma Divasa. 2001 CE January 29.

Author's Preface

Was it Coleridge who said: "The dwarf sees farther than the giant, when he has the giant's shoulder to mount on?" I owe a deep debt of gratitude to all the savants whose work is the bedrock of this compilation. I offer my sincere thanks and acknowledge their contributions to unraveling the story of the civilization of Bha_rat from over 5 millennia ago. If I have failed to acknowledge personally any specific author, work or publisher, or specifically for any map, illustration or citation included in this compilation, I request them to treat this as my humble, though belated request for permission; an encyclopedic work of this kind related to the evolutionary history of a great Himalayan river and the history of the peoples who have lived on her banks and traveled along the river, must be based on the work of previous scholars and I owe a lot to many savants and giants, whose names will be found in the bibliography, index and along with every citation included in the text. I have taken great care not to 'improve' on the original sources, I have tried to provide copies of illustrations as accurately as possible. Having expressed my thanks and acknowledgements to the giants of the past, I can scarcely find space to thank many hundreds of living people to whom I owe a lot. One source is outstanding and I should single it out: it is the R.gveda, that work unaparalleled in the history of human civilization, a work that is the very fountain of spiritualism and **dharma** for all humanity. I have drawn upon this treasured, sacred textual source and from the commentaries of the scholiast, Sa_yan.a. If there are any faults, they are entirely due to my dwarfish repertoire. I have a dream: some day, the grandchildren of today should be able to sail on boats along the River Sarasvati and re-live the pilgrimage of Balara_ma described with such reverence by R.s.i Vais'ampa_yana Vya_sa. I wish to hear the children chant on this pilgrimage to the Sarasvati_ Ti_rtha-s, the veritable World Heritage Sites: **Sarasvati_, namastubhyam varade ka_maru_pin.i_ vidya_rambham karis.ya_mi siddhir bhavatu mey sada_.** Sarasvati_ is the mother , **ambitame**, who has given us the va_k with which to praise her glory and to cherish her bounties bequeathed for generations to come.

The discovery of Sarasvati River over a stretch of 1600 km. from the Himalayas to the Arabian Sea, is the discovery of Civilization of Bha_rat and the very foundations of the culture of a billion people of the world. It is also a discovery unparalleled in the saga of earth sciences, archaeology and literary studies. The projects ongoing in Bha_rat to revive the Sarasvati River are also unprecedented in the history of human civilization, for, nowhere else in the world has there been an occurrence of such magnitude: the desiccation of a mighty, perennial river, fed by the melting glaciers which had left behind the ground-truth of traces of river courses ranging from 4 to 8 km. in width. This is one instance when the re-discovery of the ancient history of a continent will be seen to be relevant to the children of today and tomorrow by focusing on the hydrological and ground water resources development projects in complex ecological zones ranging from troughs below foothills to semi-arid lands and marshy terrains.

Sarasvati River is adored in ecstatic terms in the R.gveda as: ambitame, naditame, devitame, i.e., best of mothers, best of rivers and best of goddesses. Even in the days of the R.gveda, the River had attained the divine status since on the banks of the river were nurtured hundreds of ancient Bronze Age settlements dated to over 5,000 years ago.

The discovery of the ancient courses of the Sarasvati river is the discovery of the millennium and the date of desiccation of this great river is fundamental in providing a broad range of dates for the R.gveda and for defining the maritime/riverine nature of the ancient Indian civilization. `R.gveda refers to the might of this river flowing from the mountain to the ocean and relates to a period when the river was in full flow, fed by the glacier waters from three sources: (1) Mt. Kailas (S’atadru), (2) Yamuna (erstwhile Chambal river) fed by the glacier waters of Yamunotri and (3) Tons and Giri rivers fed by the Har-ki-dun glacier complex (Rupin and Supin) of the Bandarpunch massif (20 kms. NW of Yamunotri, in W. Garhwal, UP).

The desiccation of the river over an extended period of about 400 years (ca. between 1900 to 1500 B.C.), is the central cause for the migration of the

peoples eastward, northward and southward from the settlements on the banks of the Sarasvati river which had nourished the civilization ca. 3000 to 1700 B.C. (See websites: http://sarasvati.simplenet.com http://www.probys.com/sarasvati)

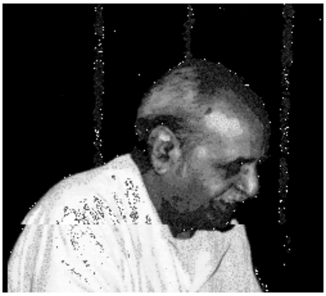
The river also binds the Rigvedic culture and the Sarasvati-Sindhu civilization since the Sarasvati river is the locus of over 1200 ancient archaeological settlements and sapta-sindhu is the Rigvedic domain.

Archaeology has provided C-14 dates for the settlements on the banks of the Sarasvati river and work in historical metallurgy has established the antiquity of the Ganeshwar mines in Rajasthan which provided the mineral sources to sustain the bronze age civilization.

Tritium (hydrogen isotope) analysis of deep water samples taken by BARC (Bhabha Atomic Research Centre) has provided a broad spectrum dating for the waters of the Sarasvati river now revealead as groundwater sanctuaries and aquifers. The waters range from 2400 to 7400 years Before Present (B.P.).

“In northwestern part of Jaisalmer district, inspite of very low rainfall (less than 150 mm) and extreme conditions of the desert, groundwater is available at depth of about 50-60m along the course of the defunct (Sarasvati) river and a few dug wells do not dry up throughout the year. It is found that the area through which the river bed is traced supports vegetation even during summer. It is thought that these courses of river in the area still maintain their headwater connection and could form potential groundwater sanctuaries for exploitation. To confirm the scenario, an environmental isotope study was undertaken in collaboration with the Groundwater Department, Rajasthan in Jaisalmer district...The groundwater samples exhibit negligible tritium content indicating absence of modern recharge. Radiocarbon data suggest the groundwater is a few thousand years old. (uncorrected ages: 4950 to 4400 BP) with a velocity of about 20 m/a.” (Rao, S.M. and Kulkarni, K.M., Isotope hyudrology studies on water resources in western Rajasthan, *Current Science*, vol. 72, no. 1, 10 January 1997, pp. 55-61).

Glaciological studies have shown the secular sequence of desiccation of the Sarasvati river: (1) the streams were flowing through Markanda river; (2) the streams migrated towards the Drishadvati river; (3) Drishadvati river migrated



eastwards, linked up with Chambal which captured the Tons river stream flowing into Sarasvati river at PaontaSaheb (H.P.); (4) S'atadru river stream which had joined Sarasvati river at Shatrana migrated westwards with a 90-degree turn at Rupar and ultimately became a tributary of the Sindhu river. Glaciological studies have also showed the existence of quartzite and metamorphic rocks in Paonta Doon valley and near Ad Badri in Siwalik ranges attesting to the existence of the mighty Vedic Sarasvati river which had brought in these signature rocks.

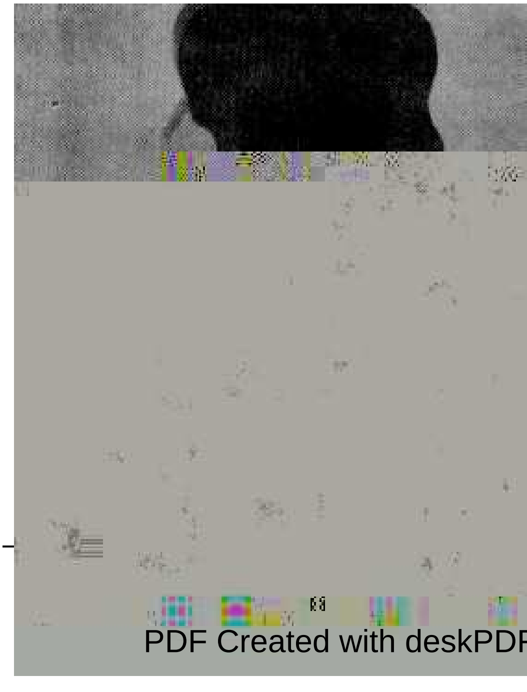
After the rise of the Himalayas, S'atadru became the anchorage river of Sarasvati; what is now called Yamuna joined the Sarasvati river at PaontaSaheb. Ganga which had emerged from Gangotri received Chambal (now Yamuna) as its tributary at Prayag, Allahabad. An important glaciological dating tool is the fact that each glacier can supply waters into a major stream like the Ganga for a period of 10,000 years. The conclusions from these earth science perspectives are that when the Sarasvati river was in its mighy flow, it had carried the glacier waters which are now carried by S'atadru and Yamuna.

Acknowledgements and Dedication

When I returned from Manila, Philippines to settle in Bha_rat to pursue the Sarasvati River research work, and presented my paper in the Xth World Sanskrit Conference in January 1996, I learnt from Dr. Ramdas of Mumbai that a group is already at work in Jodhpur, Delhi and Nagpur on the same project: Sarasvati Quest Squad organized under the auspices of Baba Saheb Apte

Smarak Samiti, Nagpur, Vedic Sarasvati Nadi Shodh Pratis.t.ha_N and Bharatiya Itihasa Samkalana Samiti, Delhi.

"...the study of the Lost Sarasvati River was planned to materialize in three stages: 1. Preparing a Report of the Quest; 2. Revisits to Quest sites for further research; and 3. Bringing out a volume called 'The Encyclopaedia of the Lost Sarasvati River...Such a study and allied publications were felt an immediate necessity not only from the point of view of Bharatiya History but also from the point of view of World History. With all zeal and zest, Dr. V.S. Wakankar, one of the senior-most archaeologists of the country, led the Quest Squad along the bed of the River. But fate willed it the other way. Dr. Wakankar succumbed to a massive heart attack on the 3rd April 1988 and the Quest Research retardedc...The Vedic Sarasvati River has an immense importance from the point of view of the History and Culture of Bharath. Revelation and compilation of the Vedic Literature took place on the banks of the Sarasvati. And from its banks the Vedic civilization spread far and wide in the world..." (Pingley, M.N., 1994, Foreword, Bapat, V.D., and Umapathy, K.R. (tr.), *Lost' River Sarasvati*, *Mysore*, Bharatiya Itihasa Sankalana Samithi (tr. from Vakankar, L.S. and Paracure, C.N., 1992, *Lupta Sarasvati_ Nadi_ s'odh (Marathi)*.



Sarasvati Quest Group (After Bapat, V.D., and Umapathy, K.R. (tr.), 1994, *Lost' River Sarasvati*, Mysore, Bharatiya Itihasa Sankalana Samithi (tr. from Vakankar, L.S. and Paracure, C.N., 1992, Lupta Sarasvati_ Nadi_ s'odh (Marathi). Bottom row: (L-R) Dattatreya Kasture, Dr. V.S. Wakankar, M.N. Pingley, Prof. Sahasrabudhe, Dr. Vedajna Arya; Top row: (L-R) Dr.

Surendra Arya, Govinda Khekale, Visvabandhu, Narayan Bhati.

Pingley, M.N. explaining the details of the Sarasvati Quest in the Town Hall of Bikaner, Rajasthan (After Bapat, V.D., and Umapathy, K.R. (tr.), 1994, *Lost' River Sarasvati,* Mysore, Bharatiya Itihasa Sankalana Samithi (tr. from Vakankar, L.S. and Parcure, C.N., 1992, *Lupta Sarasvati_ Nadi_ s'odh Samkshipt Vruttant* (Marathi).

Prof. Sahasrabudhe wrote a travelogue about this pilgrimage in Marathi and has been translated into many Indian languages. The English translation is by Anand Vaishampa_yan, Indore and is titled Vaidik Sarasvati (A Search and Reward). Let me cite from this beautiful monograph: "The history of this River Sarasvati is very intriguing. At one time the river flowed with immeasurable water, with great speed and at places it was about 8 to 10 kms. wide. Is it not mysterious that all of a sudden the river vanished? How could it happen? How could we forget that on the river banks, for centuries the aspirants and students from all over the world were imparted knowledge and education in all branches of human life? This river is not, therefore, merely a river for us. It is a branch and life-line of olur culture…The purpose of this research project is to remind the world that we should know the history of our nation and to revive our self-respect… Mny times the river Sarasvati and the Goddess Sarasvati made us feel their presence. We saw the personified form of the white lotus flowers blooming in the river;



the sight created waves of joy and delight in us. We were inspired inhaling their mild scent. She imparted divinity and riches to the people living on its bank and she uplifted them. Effortlessly a poem in praise of Sarasvati composed by Prajna Bharati Dr. Shridhar Bhaskar Varnekar came out and each day the members of our team recited it: ambitame nadi_tame devitame sarasvati_, jaya saridvare he sarasvati_ tvam nagapatikanyaka_si dhanya_ saptasindhu bhagini_tica ma_nya_ s'ata s'ata yajnana susambhr.ta pun.ya_ s'r.tigi_te bhagavati_; plaks.a prasravan.e tava jananam dharmaks.etre ca_ntardha_nam, prabha_sati_rthembudhi sangamanam suprathita bhavati; vad.ava_nala da_ha_pasa_ran.am s'ivas'ankara kalmas.a_paharam, tava mahima_nam vadati pura_n.am mahadadbhuta bhagavati_; ks.udha_kula_na_m dhanavivardhini_ sarvankas'a kalya_n.aka_rin.i_, prakat.i_bhava bhagavati, a_virbhava bhagavati; ambitame nadi_tame devitame sarasvati_ jaya saridvare he sarasvati_." (p.59, p. 109 mss.)
From L to R: Darshan Lal Jain, Suraj Bhan (Hon'ble Governor of Uttar Pradesh) and M. N. Pingley (Samrakshak, Akhila Bharatiya Itihaasa Sankalana Samiti). Yamunanagar (Jagadhri, Haryana). July 1999. Celebrating the work of Sarasvati Shodh Samsthaan, Haryana, affiliated with the Akhila Bharatiya Itihaasa Sankalana Yojana. The Samsthaan promotes citizens' participation in the Sarasvati River Revival, Watershed Development and Indian Historical Research Projects.

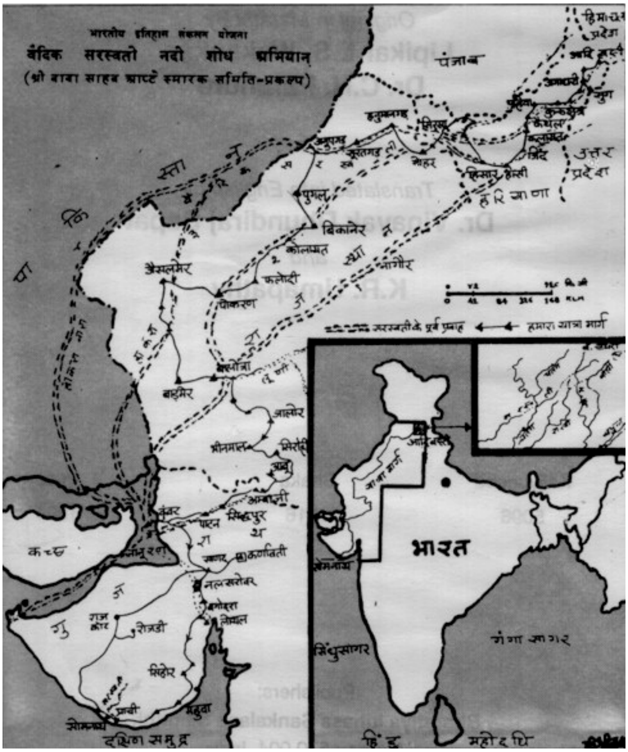
Aurel Stein's tour of Sarasvati (After Possehl, G.L., 1999, *Indus Age, The Beginnings*, Fig. 2.47).



In writing this work I have drawn on the research of many scholars who have studies the Civilization from many disciplines and many perspectives: archaeological, artistic, linguistic, ethnographic, geological, hydrological and historical. I have drawn inspiration from

the millions of people living in the villages and cities of Bha_rat and in particular, from the children all along the Sarasvati River Basin, who in many places travel over 10 kilometers every day to fetch a pail of water.

The route taken by the scholars of the Sarasvati Quest Group between 19 November 1985 to 20 December 1985. (After Wakankar, L.S., and Parchure, C.N., 1994, tr. from Marathi, *A quest after the lost Vedic Sarasvati river—an expedition report*, Mysore: Bharatiya Itihasa Sankalana Samiti: Frontispiece). From Adh Badri: Yugandhara (Jagadhri), Sarasvatnagar, Kurukshetra, Bhagwanpur, Vasishthashram, Vishwamitra Tila, Pruthudak, Kaithal, Kapilayatan (Kolayat), Hansi, Hissar, Agroda, Banawali, Sirsa, Odu, Gogamedhi, Nauhar (Rajasthan), Soti, Karoti, Talwada, Pallu, Rawatsar, Hanumangarh, Kalibangan, Rangmahal, Suratgarh, Anupgarh, Pugal, Chatargarh, Loonkaransar, Deshnokh, Bikaner, Kuggal, Chhatargarh, Nalgajner, Dhug, Potal, Bap, Falodi, Ramdevara, Pokharan, Bhadariya, Jadau, Jaisalmer, Besakhi, Ramkund, Olodrawa, Aakal, Devikot, Sargan, Goonga, Devakar,m Badmer, Kiradu, Joonakhed, Balotra, Pachbhadra, Nakoda, Jalor, Bheenmal, Jasavantpura, Sirohi,



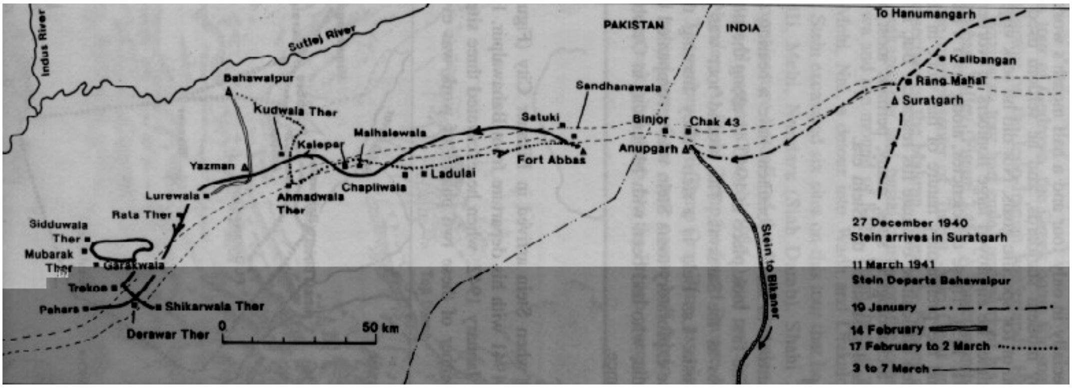
Vasantgarh, Arbudaranya, Abu, Nanukachcha, Ambaji, Siddhapur, Nalsarobar, Sanand, Sihor, Rajula, Prachiteertha, Somnath).

Many scholars have surveyed the ancient sites on the Sarasvati River Basin. Foremost among them is Aurel Stein whose Sarasvati Tour began on 17 December 1940 from Bikaner for 3 months and continued for a month each in December 1941 and January 1942 (for excavations at Kaleparf (also known as Bhoot = ghost), Ahmedwala Ther and Kudwala Ther). He died on 26 October 1943 in Kabul. Stein noted 58 prehistoric sites and also a Kushan period mount at Rang Mahal. These explorations were followed by A. Ghosh of the Archaeological Survey of India in 1950-53, by Dr. Katie Feroz Dalal (Frenchman) in 1970 and by M. Rafique Mughal between 1974 and 1978.

Since the work is also an attempt to provide keys to decipher the inscriptions of the civilization, extensive use has been of the pictorial material of seals and sealings from the sites in India and Pakistan and also the Ancient Near East seals held in various museums around the world. The reproduction based on these illustrations is intended to further the academic research work related to the script problem. The list of sources is too voluminous to acknowledge individually in this preface; in most instances, the sources have been cited at the appropriate places; the author wishes to acknowledge individually the debt of gratitude owed to them in making this encyclopaedic work a possibility and also to facilitate further researches. **It should be noted that many maps are only sketch maps and are not intended to reflect the present day international borders or boundaries., for which purposes the official maps of the countries should be used.**

The book has been made possible by the support of numerous scholars and institutions who have contributed enormously to the understanding of the civilization. My first thanks are to all the members of the Akhila Bha_rati_ya Itiha_sa Sankalana Yojana who have guided me and encouraged me in my research work, in particular Shri M.N. Pinglay, Shri Ramsingh Thakur and Shri Haribhau Vaze. We acknowledge with gratitude the contribution made by philanthropist **Shri G.K.Pulla Reddy** who has made the printing and publication of this work possible.

For the first time in the history of Indian Civilization, Sarasvati River provides evidence of many different communities living together in an urban culture. The River, together with the Sindhu River was the unifying link providing for transport of people of people and material over thousands of kilometers. The grear rivers, the Sarasvati and the Sindhu were the raison d'etre for the



civilization which was the most extensive civilization of an age dated back to the beginning of Kaliyuga, that is, over 5,000 years before present.

This book is dedicated to the children of the world, while remembering that we are beneficiaries of the heritage left for us by our ancestors who toiled on the Sarasvati River Basin for the benefit of future generations.

For, I cannot forget the memory of a child in Rajasthan offering me drinking water in the midst of the Marusthali, the Thar or Great Indian Desert. She

quenched my thirst and did not charge me anything for this life-giving water from Sarasvati. This is the water which she has fetched by traveling 10 kilometers and from a well dug, she said, by Bhoja Raja. If this work contributes a little to creating an awareness of the possibility of building a million groundwater abstraction structures such as wells, dug-cum-bore wells and bore wells, using the resources left for us by the mighty Sarasvati River, the work would have achieved its purpose. The ground-truth of Sarasvati River should lead to making the entire River Basin a fertile region again, as it was over 5,000 years ago and to make the water resources accessible to the people of Bharat.

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Kaliyugabda 5102. Shalivahana Shaka 1922. Magha Shukla Vasant Panchami : Sarasvati Nadi Janma Divasa. 2001 CE January 29.

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Yellow sandstone, sculpted pillar from Jain temple in Marot Fort, now in Bahawalpur Museum. (After Mutghal, 1997, Pl. 1312).

Many forts and temples along the Rivers Sindhu and Sarasvati need to be restored and maintained as World Heritage Sites.

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